

1 **1C.1.3 East Bay Municipal Utility District**



RICHARD G. SYKES
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VIA EMAIL (bcnelson@usbr.gov) AND U.S. MAIL

September 29, 2015

Mr. Ben Nelson, Natural Resources Specialist
Bureau of Reclamation, Bay-Delta Office
801 I Street, Suite 140
Sacramento, CA 95814-2536

SUBJECT: Comments on the Draft Environmental Impact Statement for the Coordinated Long-Term Operation of the Central Valley Project & State Water Project

Dear Mr. Nelson:

The East Bay Municipal Utility District (EBMUD) appreciates this opportunity to comment on the Draft Environmental Impact Statement for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project (DEIS). EBMUD supplies water to nearly 1.4 million people in the East Bay. EBMUD's 332-square mile water service area encompasses incorporated and unincorporated areas within Alameda and Contra Costa Counties. EBMUD's Mokelumne River and East Bay watershed sources of supply are sufficient in most years. However, to reliably meet the needs of its customers in dry years, EBMUD uses CVP water under its Long Term Renewal Contract No. 1406-200-5183A-LTR1 (LTRC) with Reclamation in addition to its Mokelumne and East Bay supplies.

EBMUD
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Table 5D.33 of Appendix D of the DEIS tabulates water demand and supply information for EBMUD under future conditions. Information in this table appears to have been developed based on review of EBMUD's 2010 Urban Water Management Plan and Water Supply Management Program 2040 Plan. However, information is incorrect and the manner in which information is presented in this table does not accurately reflect EBMUD's portfolio approach to meeting current and future water demands or the unique nature of EBMUD's dry-year only LTRC. EBMUD's Mokelumne system is severely limited during droughts. Our CVP supply is central to our drought planning and provides a critical water supply that reduces the potential for severe water rationing and economic losses during droughts, in combination with continued use of stored Mokelumne supplies, aggressive conservation and recycling programs, and other water supplies.

EBMUD
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EBMUD requests that Table 5D.33 be corrected as shown in the attached redlined version of the table. Based on EBMUD's understanding of the alternatives, we do not believe our water supply planning would change based on Reclamation's implementation of a preferred alternative.

We appreciate this opportunity to comment on the DEIS. If you have any questions about these comments, please contact me at 510-287-0125.

Sincerely,

A handwritten signature in blue ink, reading 'Michael T. Tognolini'.

Michael T. Tognolini
Manager of Water Supply Improvements

Attachment

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Appendix 1C: Comments from Regional and Local Agencies and Responses

1 Table 5D.33 East Bay Municipal Utility District

Items	Water Demand and Supplies (acre-feet)	Notes
Water Demand		
Service Area Water Demand	256,500 <u>349,440¹</u>	East Bay Municipal Utility District. 2011. <i>Urban Water Management Plan 2010 Document</i> . June.
Water Sales to Others	–	–
Total Demand	256,500 <u>349,440</u>	–
Water Supplies for NAA		
	Supplemental supply	Up to 133,000 acre-feet in a dry year, with a maximum of 165,000 acre-feet over three dry years, CVP Water Service Contract (14-08-200-5183A-LTR1) from the American River.
CVP Water Supplies	<u>Dry year supply</u>	<u>Up to 133,000 acre-feet in a dry year, with a maximum of 165,000 acre-feet over three dry years, CVP Water Service Contract (14-08-200-5183A-LTR1) from the American River.</u>
SWP Water Supplies	–	–
Other Imported Water Supplies	241,746 <u>Up to 240,800²</u>	Up EBMUD has up to 364,037 acre-feet of water rights on the Mokelumne River, but available amount varies depending on hydrology per East Bay Municipal Utility District. 2012 <i>Water Supply Management Program 2040 Plan</i>. April. Assume 241,746 acre-feet based on information per East Bay Municipal Utility District. 2011. <i>Urban Water Management Plan 2010 Document</i>. June. and East Bay Municipal Utility District. 2012 <i>Water Supply Management Program 2040 Plan</i>. April.
Local Surface Water Supplies	16,800	Water rights from local watersheds within the East Bay Municipal Utility District (EBMUD) watershed average 16,800 to 28,000 acre-feet per East Bay Municipal Utility District. 2012 <i>Water Supply Management Program 2040 Plan</i>. April. 2011. <i>Urban Water Management Plan 2010</i>. June.
Groundwater	1,420 <u>Dry year supply</u>	<u>Up to 1,120 acre-feet in dry years.</u> Bayside Groundwater Project Phase 1 groundwater recharge facility within EBMUD service area per East Bay Municipal Utility District. 2012 <i>Water Supply Management Program 2040 Plan</i>. April. Assume 241,746 acre-feet based on information per East Bay Municipal Utility District. 2011. <i>Urban Water Management Plan 2010 Document</i>. June. and East Bay Municipal Utility District. 2012 <i>Water Supply Management Program 2040 Plan</i>. April.

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Appendix 1C: Comments from Regional and Local Agencies and Responses

Items	Water Demand and Supplies (acre-feet)	Notes
Recycled Wastewater	41,200 <u>22,400²</u>	41,200 acre-feet additional reclamation per East Bay Municipal Utility District. 2012. Water Supply Management Program 2040 Plan. April. This value is consistent with 20,970 acre-feet in East Bay Municipal Utility District. 22,400 acre-feet from East Bay Municipal Utility District. 2011. Urban Water Management Plan 2010 Document. June.
Recycled Stormwater	–	–
Desalination ⁴	Dry year supply	<u>Up to 22,400 acre-feet in dry years from regional desalination facility; however, not anticipated until 2040 per East Bay Municipal Utility District. 2011. Urban Water Management Plan 2010 Document. June.</u>
Transfers/Exchanges ⁴	Dry year supply	<u>5,040 to 49,952 acre-feet in dry years. Transfers from Northern California water users per East Bay Municipal Utility District. 2012. Water Supply Management Program 2040 Plan. April.</u>
Conservation	35,580 <u>69,440⁵</u>	35,580 acre-feet from permanent conservation programs per East Bay Municipal Utility District. 2012. Water Supply Management Program 2040 Plan. April. This is greater than projections of 25,227 EBMUD's Water Conservation Master Plan is based on 69,440 acre-feet conservation in 2040 per East Bay Municipal Utility District. 2011. Urban Water Management Plan 2010 Document. June. <u>Up to 38,500 acre-feet could be saved from 45 percent rationing during droughts or emergencies as compared to UWWMP demand projections for 2030. However,</u>
<u>Bayside Groundwater Project Phase 2⁴</u>	<u>Dry year supply</u>	<u>2,240 to 10,080 acre-feet in dry years. Bayside Groundwater Project Phase 2 per East Bay Municipal Utility District. 2011. Urban Water Management Plan 2010 Document. June.</u>
<u>Groundwater Banking outside of EBMUD service area⁴</u>	<u>Dry year supply</u>	<u>Dry year supply of 4,704 acre-feet of groundwater banking in Sacramento Valley and/or 19,500 acre-feet in San Joaquin Valley; not anticipated until 2040 per East Bay Municipal Utility District. 2012. Water Supply Management Program 2040 Plan. April.</u>
<u>Enlarge Lower Bear Reservoir⁴</u>	<u>Dry year supply</u>	<u>Up to 4,500 acre-feet in dry years; however, not in plan for 2030 per East Bay Municipal Utility District. 2012. Water Supply Management Program 2040 Plan. April.</u>

EBMUD
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Appendix 1C: Comments from Regional and Local Agencies and Responses

<u>Expand Los Vaqueros Reservoir⁴</u>	<u>Dry year supply</u>	<u>Exact amount available to be determined and additional study needed per East Bay Municipal Utility District Urban Water Management Plan 2010 June.</u>
Total <u>Future</u> Water Supplies for NAA	349,440⁶ <u>(non-dry years)</u>	Does not include CVP water supply for dry years or up to 15 percent rationing in dry years <u>or other dry year supply projects.</u>
<u>Possible Future Water Supplies</u>		
Bayside Groundwater Project Phase 2	10,080	Bayside Groundwater Project Phase 2 per East Bay Municipal Utility District 2012 Water Supply Management Program 2040 Plan April. Requires further study and environmental analyses.
Groundwater Banking outside of EBMUD service area	-	Includes 4,704 acre-foot of groundwater banking in Sacramento Valley and/or 19,500 acre-foot in San Joaquin Valley; not anticipated until 2040 per East Bay Municipal Utility District 2012 Water Supply Management Program 2040 Plan April.
Transfers	44,660	Transfers from Northern California water users per East Bay Municipal Utility District 2012 Water Supply Management Program 2040 Plan April.
Regional Desalination Facility	-	Up to 22,400 acre-foot from regional desalination facility; however, not anticipated until 2040 per East Bay Municipal Utility District 2012 Water Supply Management Program 2040 Plan April.
Enlarge Lower Bear Reservoir	-	Up to 4,500 acre-foot; however, not in plan for 2030 per East Bay Municipal Utility District 2012 Water Supply Management Program 2040 Plan April. Enlargement of Pardee Reservoir is not included in the recommendations of the East Bay Municipal Utility District 2012 Water Supply Management Program 2040 Plan April.
Expand Los Vaqueros Reservoir	6,700	Up to 6,700 acre-foot per East Bay Municipal Utility District 2012 Water Supply Management Program 2040 Plan April.
Subtotal Potential Future Water Supplies	-	All future projects not included for M&I No Action Alternative assumptions since some of the future projects are not fully defined or analyzed.
Total Potential Future Water Supplies	206,446	Does not include CVP water supply for dry years or up to 15 percent rationing in dry years.

EBMUD
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Notes:

1 Represents EBMUD's projected 2040 demand.
2 "Other Imported Water Supplies" include EBMUD's entitlements on the Mokelumne River.
Although EBMUD has water rights up to 364,037 acre-feet, the actual amount available in any
given year varies depending on hydrology, required releases to senior downstream water rights
holders, and releases to meet instream flow requirements.
3 EBMUD's goal is to deliver 22,400 acre-feet of recycled water by the year 2040.
4 EBMUD has identified a range of water supply projects that it will pursue simultaneously to meet
future water needs. By considering a broad mix of projects, with inherent scalability and the ability
to adjust implementation schedules for a particular component, EBMUD will be able to minimize the
risks associated with future uncertainties such as project implementation challenges and climate
change. If EBMUD is able to successfully develop one component, this could result in deferral of
other additional water supply components over the planning period.
5 EBMUD's goal for conservation is 69,440 acre-feet by the year 2040.
6 During normal years, EBMUD anticipates having sufficient supplies to meet demands. Meeting
customer demands during dry years will depend on the use of CVP supplies, rationing, and the
implementation of additional water supply projects.

EBMUD
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2 **1C.1.3.1 Responses to Comments from East Bay Municipal Utility District**

3 **EBMUD 1:** Comment noted.

4 **EBMUD 2:** The suggested changes have been included in Table 5D.33 of
 5 Appendix 5D, Municipal and Industrial Water Demands and Supplies.
 6 Information related to future actions have been categorized within the definitions
 7 of the No Action Alternative and the cumulative effects actions.

1 **1C.1.4 El Dorado County Water Agency**



El Dorado County Water Agency

Maria Capraun
Georgetown Divide P.U.D.

James R. Jones
South Tahoe P.U.D.

Michael Ranalli
Board of Supervisors

Shiva Frentzen
Board of Supervisors

Brian K. Veerkamp
Board of Supervisors

September 24, 2015

Mr. Ben Nelson,
Natural Resources Specialist
Bureau of Reclamation, Bay-Delta Office
801 I Street, Suite 140
Sacramento, CA 95814-2536

Subject: El Dorado County Water Agency (EDCWA) Comments

Dear Mr. Nelson:

This letter summarizes EDCWA comments to the Bureau of Reclamation (Reclamation) Draft Environmental Impact Statement for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project (DEIS). Comments relate entirely to EDCWA's pending long term water service contract with Reclamation for up to 15,000 acre-feet annually (AFA) of Central Valley Project (CVP) municipal and industrial M&I water supply. The contract was mandated by Public Law 101-514, Section 206(b)(1)(B), dated November 5, 1990, and is commonly referred to as the "EDCWA Fazio Contract".

EDCWA
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Comment 1. The DEIS erroneously refers to the EDCWA Fazio Contract in several locations as a Warren Act Contract. The EDCWA Fazio Contract should be correctly characterized in the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) as a long-term water service contract. Error locations in the DEIS include, but may not be limited to:

EDCWA
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- Executive Summary, Section ES.8.8, Alternative 5.
- Chapter 3, Section 3.4.5.1, Continued Long-Term Operation of the CVP and SWP Facilities.
- Chapter 3, Section 3.4.7.1.1, Water Demands.
- Chapter 5, Section 5.4.3.4 Alternative 3.
- Chapter 5, Section 5.4.3.6 Alternative 5.

Comment 2. The EDCWA Fazio Contract is integral and immediate to any future operation of the CVP and should therefore have been included in all alternatives, rather than just Alternatives 3 and 5. The allocation of 15,000 AFA is assumed under the No

EDCWA
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Natural Resources Specialist
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Action Alternative and should also be assumed under all other alternatives in the DEIS. Accordingly, the EDCWA Fazio Contract and the full 15,000 AFA need to be clearly identified and incorporated into Reclamation's ROD, regardless of which alternative or combination of alternatives Reclamation selects for the following reasons:

EDCWA
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1. The ROD should recognize Reclamation's intent to comply with Public Law 101-514 which directs and requires the Secretary of the Interior to execute the contract;
2. The ROD should be consistent with Reclamation's analysis contained in the "Biological Assessment on the Continued Long-term Operations of the Central Valley Project and the State Water Project, dated August 2008" (2008 BA); and
3. The ROD should recognize that, after extraordinary effort by the parties over many years, the contracting process is nearly complete. To date, Reclamation has: (a) negotiated and is in the process of updating a draft final contract with EDCWA; (b) completed and released a Draft EIS for public review; and (c) completed Endangered Species Act Section 7 consultation and received letters of concurrence from the U.S. Fish and Wildlife Service and National Marine Fisheries Service respectively. In addition, the EDCWA Board of Directors (Board) has certified the Final Environmental Impact Report for purposes of California Environmental Quality Act (CEQA) compliance. The Board has directed the Interim General Manager to complete the process and execute the contract on a priority basis as soon as possible during this fiscal year.

Thank you for your consideration. EDCWA is prepared to provide additional information as necessary to further support our comments. Please contact me directly at ken.payne@edcgov.us or (916) 425-0734.

Sincerely,



Kenneth V. Payne, P.E.
Interim General Manager
El Dorado County Water Agency

cc: Mr. Jim Abercrombie, General Manager, El Dorado Irrigation District
Mr. Ron Milligan, Regional Operations Manager, Bureau of Reclamation
Mr. Drew Lessard, Area Manager, Bureau of Reclamation
Mr. Rick Woodley, Regional Resources Manager, Bureau of Reclamation
Craig Muehlberg, Deputy Area Manager, Bay-Delta Office

1C.1.4.1 Responses to Comments from El Dorado County Water Agency

EDCWA 1: Comment noted.

EDCWA 2: The text has been modified in Section ES.8.8 of the Executive Summary; Sections 3.4.5.1 and 3.4.7.1.1 of Chapter 3, Description of Alternatives; and Sections 5.4.3.4 and 5.4.3.6 of Chapter 5, Surface Water Resources and Water Supplies to provide the correct reference to the El Dorado County Water Agency water service contract.

EDCWA 3: Specific implementation plans and approvals for delivery of CVP water under the El Dorado County Water Agency water service contract were not finalized at the time of the publication of the Notice of Intent for this EIS in March 2012. Therefore, these deliveries were not included in the No Action Alternative or all of the alternatives. This water service contract has been included in Alternatives 3 and 5 of the EIS. However, during the review of the numerical modeling analyses used in this EIS, it was discovered that the demands for the El Dorado County Water Agency contract were not included in the CalSim II modeling analysis for Alternatives 3 and 5 as presented in Chapters 5 through 21. A sensitivity analysis using the CalSim II model to compare the results of the analysis with and without these demands is presented in Appendix 5B of this EIS for Alternatives 3 and 5. The results of the sensitivity analysis have been used in conjunction with the results presented in Chapters 5 through 21 to analyze the effects of including the CVP water service contract for El Dorado County Water Agency in Alternatives 3 and 5, as described in Sections 3.4.6 and 3.4.7 of Chapter 3, Description of Alternatives, and Section 5.4.3 of Chapter 5, Surface Water Resources and Water Supplies. Results of the impact analysis for all of the alternatives will be considered by Reclamation during preparation of the Record of Decision.

1 **1C.1.5 El Dorado Irrigation District**

Bill George – *President*
Division 3

Greg Prada – *Director*
Division 2

Dale Coco, MD – *Director*
Division 4



George Osborne – *Vice President*
Division 1

Alan Day – *Director*
Division 5

Jim Abercrombie
General Manager

Thomas D. Cumpston
General Counsel

In reply refer to: M0915-015 and L2015-53

September 29, 2015

Mr. Ben Nelson
Bureau of Reclamation
Bay-Delta Office
801 I Street, Suite 140
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Via Facsimile (916) 414–2439
Via Email bcnelson@usbr.gov

RE: Comments Regarding Draft Environmental Impact Statement for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project

Dear Mr. Nelson:

Thank you for the opportunity to provide comments to the U.S. Bureau of Reclamation (Reclamation) on the Draft Environmental Impact Statement (DEIS) for the Coordinated Long-Term Operation of the Central Valley Project (CVP) and State Water Project (SWP) (Project). The El Dorado Irrigation District (EID) has vital interests in the Project and its environmental review as a holder of one CVP Water Service Contract (WSC) and two Warren Act Contracts (WAC), as a proposed subcontractor for a second WSC at Folsom Reservoir, and as the only water purveyor that does not receive its Folsom Reservoir supplies from federal pumping facilities.

EID 1

EID currently holds a long-term WSC in the amount of 7,550 acre-feet (AF) annually. In addition to this CVP supply in Folsom Reservoir, EID also holds a long-term WAC in the amount of 4,560 AF annually associated with long-held water rights for which EID has relocated its points of diversion or redirection to Folsom Reservoir. Further, EID holds a 5-year WAC in the amount 8,500 AF annually, which represents a portion of a 17,000-AF water right EID holds. EID and Reclamation have been working together for the past decade to enter into a long-term WAC for the full quantity of this right. In addition to these supplies, EID is a proposed subcontractor to El Dorado County Water Agency (EDCWA) for a proposed WSC as required by Public Law 101-514, Section 206(b)(1)(B). EDCWA has been pursuing that WSC with

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Reclamation since the early 1990s. These existing and future supplies will be withdrawn from Folsom Reservoir through EID's intake facilities that have been in operation since 1961.

EID 1
continued

The following comments address EID's concerns about inconsistencies and errors in how the WSC and WAC are addressed and characterized in the DEIS, and also address Reclamation's requirement to construct a temperature control device or equivalent contribution to a regional solution in association with EID's pursuit of its non-federal supplies in Folsom Reservoir.

Current and Future Demands and Supplies of El Dorado Irrigation District

In Chapter 5 *Water Resources and Water Supplies*, the DEIS states that assumptions related to municipal water demands are based upon review of Urban Water Management Plans (UWMPs) (page 5-67). Future supplies were compared to the No Action Alternative and the Second Basis of Comparison assumptions to determine if the projects were reasonable and certain to occur by 2030. Reclamation indicated that projects that had undergone environmental review or met other certain specified conditions were included in the future water supply assumptions for 2030 in the No Action Alternative and the Second Basis of Comparison. Projects described in the UWMPs that are currently under evaluation were included in the Cumulative Effects analysis for future water supplies. Finally, in the DEIS Reclamation indicated that future water supplies considered for municipalities by 2030 were presented in Appendix 5D *Municipal and Industrial Water Demands and Supplies*.

EID 2

Although Chapter 5 of the DEIS describes this decision process for future water supplies, Appendix 5D introduces two additional terms –“Possible Future Water Supplies” and “Potential Future Water Supplies” – but does not appear to define these terms or explain if either or both are included within the roster of projects Reclamation has determined to be reasonable and certain to occur by 2030. Inclusion of the descriptors “possible” and “potential” implies there may be some question as to whether projects in these categories would proceed. In the case of the 17,000 AF WAC and 15,000 AF WSC, these contracts should be categorized as “projected” or “planned” if there is a need to qualify or subcategorize future Reclamation Actions.

EID completed its environmental review of the 17,000-AF WAC by filing a California Environmental Quality Act (CEQA) Notice of Determination on July 13, 1999. El Dorado County Water Agency (EDCWA) completed its CEQA review of the 15,000-AF CVP WSC by filing its NOD on January 20, 2011. Therefore, the CEQA obligations for these contracts were satisfied prior to initiation of environmental review (determined by issuance of the Notice of Intent) for the Project and these contracts have been included in UWMPs for many years.

EID 3



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Further, Reclamation consulted with the National Marine Fisheries Service (NMFS) regarding both the WAC and WSC and received Endangered Species Act determination concurrence for full execution of both actions on May 22, 2014 and June 2, 2014, respectively.

EID 3
continued

Given this information, these contracts should be included with the Municipal Water Supply Projects that, together with a host of other actions, would occur with or without the Project as described on pages ES-9 and ES-10. However, for unknown reasons, Reclamation has, at least in some portions of the DEIS (pages 3-34, 3-41, 5-126, and 5-181 among potential others), not acknowledged these contracts as such and instead has proposed implementation of both these actions separately from all other Municipal Water Supply Projects with the same or similar status. Further, it appears that completion of the final steps of these contracting efforts, even though they have been ongoing for the past decade or more, are only proposed under Alternatives 3 and 5 of the Project. This treatment is erroneous: Reclamation has included both contracts in future condition Operational Criteria and Plan (OCAP) modeling for over a decade in both the 2004 and 2008 OCAP consultations, issued a DEIS for the EDCWA WSC, executed a five-year WAC for 8,500 AF of the full 17,000 AF, collaborated with EID to prepare NEPA documentation for the 17,000 AF long-term WAC, and publicly negotiated the WSC and WAC. The supplies provided by these contracts represent critical needs for the citizens of El Dorado County and are reasonably certain to occur. Therefore, for the reasons described herein, EID respectfully requests that Reclamation remove the separate characterization of these two contracts from the EIS and properly include these contracts (or clarify that they are already included) with the Municipal Water Supply Projects that would be considered to occur under the No Action Alternative and Second Basis of Comparison and, therefore, implemented under all alternatives.

EID reviewed Appendix 5A and notes that at page 5A-51, EID's 4,560-AF long-term WAC does not appear to be included in the modeling assumptions for the No Action Alternative and Second Basis of Comparison. EID and Reclamation executed this WAC (Contract No. 06-WC-20-3315) on September 9, 2010 and EID has regularly exercised the WAC since 2011. These demands should therefore be included in the modeling analysis. EID notes that in this location of the document, both the 17,000-AF WAC to EID and the 15,000-AF WSC to EDCWA are correctly included in the No Action Alternative and Second Basis of Comparison.

EID 4

EID reviewed Appendix 5D and notes that Reclamation correctly characterized EID's 17,000-AF water supply provided by the El Dorado Hydroelectric Project (Project No. 184) as an existing supply (page 5D-15) under the No Action Alternative (NAA). However, this page erroneously

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states that this supply is diverted at Forebay Reservoir. EID does divert some Project No. 184 water at Forebay Reservoir for consumptive uses pursuant to various pre-1914 water rights, but the water rights permit for the 17,000-AF supply requires that it be diverted from Folsom Reservoir under a WAC. The five-year, 8500-AF WAC (Contract No. 15-WC-20-4654) currently satisfies that requirement.

EID 5
continued

On page 5D-16, Reclamation incorrectly characterizes agricultural ditch supplies diverted from the North Fork Cosumnes River, Clear Creek, and Squaw Hollow Creek as contributors towards EID's municipal and industrial (M&I) water supplies. In fact, these are non-potable water supplies provided to EID's agricultural customers who have no other alternative sources. They cannot be utilized for M&I purposes and are not influenced by M&I supply conditions. The agricultural descriptor should conversely be removed from the EID water demand in Table 5D.12. The Middle Fork Cosumnes River supply described on that page serves potable water supplies to an EID satellite water systems that has no interconnection with EID's main system and cannot be served by M&I supplies from or influenced by Folsom Reservoir conditions. This supply should also be removed from this description of currently available supplies under the NAA.

Further, EID notes that Reclamation has incorrectly characterized the current available supplies of recycled water under the NAA. In its UWMP, EID noted that approximately 3,804 AF of recycled water is currently available annually. Supplies may climb to 7,730 AF annually by 2030 as additional wastewater is generated that can be treated to recycled water standards, but the availability of these supplies is affected by the amount of M&I water available, including the 17,000 AF WAC and EID's portion of the 15,000-AF WSC to EDCWA.

In summary, it appears that not every alternative in the DEIS as written clearly includes the long-proposed EID and EDCWA contracts. Unless this error is corrected, it is possible that Reclamation could select an alternative in the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) that omits these contracts, which could leave Reclamation without the NEPA coverage to enter into these contracts and thus leave EID unable to access critical supplies that we have been working toward in cooperation with Reclamation for over a decade.

EID 6

Heeding Reclamation's recommendations and advice on many occasions over the past several years, EID and EDCWA have patiently waited for the remand process to take its course so the final steps of the contracting process could be completed. We are therefore alarmed to find ourselves responding to a DEIS that fails to clearly and properly characterize our contracts, and



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that potentially excludes them from NEPA coverage, without any prior notice, coordination, or explanation from Reclamation. EID requests that Reclamation utilize the FEIS/ROD process to rectify this error and clarify and correctly characterize these two contracts so they are clearly included under each alternative.

EID 6
continued

Requirement for Temperature Control Device (TCD) on EID Facilities

Reclamation and EID have been working together for nearly twenty years to develop mechanisms to manage the cold water pool in Folsom Reservoir, while also providing the M&I water supplies that the Folsom facilities were intended to serve. As part of those efforts, EID secured federal funding through congressional authorizations and appropriations on three separate occasions to offset the costs to construct new, or modify EID's existing intake facilities to improve temperature control. Since securing those authorizations and funding, EID has conducted and shared with Reclamation numerous engineering and modeling evaluations and determined that the significant capital costs of modifying EID's facilities would provide only nominal cold water pool benefits. EID has therefore advocated allocating this funding and other matching sources toward a regional TCD solution that would more effectively contribute toward improving temperature management of the penstock outlet facilities, and has funded technical analyses to identify effective solutions. EID and Reclamation have negotiated contractual provisions acknowledging the option to pursue, and EID's contribution toward, the most cost-effective solution, which is reflected in WAC 15-WC-20-4654 currently being exercised. NMFS has accepted this agreement in its May 22, 2014 Endangered Species Act (ESA) concurrence letter to Reclamation for the full 17,000-AF WAC.

EID 7

Even though Reclamation and NMFS have both agreed to this approach, the DEIS does not appear to acknowledge this important fact. Page 3-21 describes various structural improvements for temperature management, including a TCD on EID's intake facilities, but this section only describes the facilities in the context of actions that would otherwise occur by 2030 under the No Action Alternative. Page ES-5 indicates that many of the provisions of the 2009 NMFS Biological Opinion (BO) will require subsequent environmental documentation for future facilities to be constructed or modified, which EID understands includes either a TCD on EID's facility or a regional TCD solution. This page continues by indicating that specific actions are not known at this time and therefore the EIS assumes completion of the actions in a manner consistent with the ESA and does not address impacts during construction or start-up phases. Accordingly, it does not appear that the DEIS accurately reflects Reclamation's view that the potential requirement of installing a TCD at EID's intake that would be cost-ineffective and

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make negligible improvements to Folsom Reservoir temperature management, and should therefore be abandoned.

EID 7
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Although Page ES-11 indicates that Alternative 2 does not include implementation of the 2009 NMFS BO Reasonable and Prudent Alternative Action II.3 Structural Improvements for Temperature Management on the American River, of which the EID-facility TCD is a part, EID was unable to locate any other reference to this TCD in the document. Therefore, EID respectfully requests that in the Final EIS, Reclamation include within the proposed action and alternatives the option to proceed with the regional TCD solution concept as included within WAC 15-WC-20-4654 and authorized by NMFS.

EID respectfully requests that Reclamation address these comments to correctly characterize EID's existing and near-term water supplies and the potential for EID to contribute toward a regional TCD solution during preparation of the Final EIS, which EID understands is due by December 1, 2015 according to the U.S. District Court for the Eastern District of California. If there are any questions regarding these comments please contact Dan Corcoran, Environmental Manager, at (530) 642-4082 so that EID can facilitate Reclamation's revisions in the FEIS.

EID 8

Sincerely,

A handwritten signature in blue ink, appearing to read 'Jim Abercrombie', is written over a blue circular stamp.

Jim Abercrombie
General Manager

JA:DMC:pj

cc: Tom Cumpston, General Counsel
Brian Poulsen, Senior Deputy General Counsel
Brian Mueller, Director of Engineering
Dan Corcoran, Environmental Manager
Drew Lessard, Central California Area Office Manager, Bureau of Reclamation
Ron Milligan, Central Valley Operations Office Manager, Bureau of Reclamation
Ken Payne, Interim General Manager, El Dorado County Water Agency

1C.1.5.1 Responses to Comments from El Dorado Irrigation District

EID 1: Comment noted.

EID 2: In Appendix 5D, the words “Possible Future Water Supplies” refer to water supplies considered under a cumulative effects analysis. The words “Potential Future Water Supplies” refers to the total of water supplies considered under the No Action Alternative and the cumulative effects analysis.

In the Final EIS, the next-to-last subheading in the tables has been changed to “Subtotal Possible Future Water Supplies.”

EID 3: As described in Appendix 5B, Sensitivity Analysis on Representation of EID’s Warren Act and EDCWA’s Water Service Contracts with Reclamation in Alternatives 3 and 5, of the EIS, these two actions were included in a sensitivity analysis in Alternatives 3 and 5. These actions were not included in the No Action Alternative, Second Basis of Comparison, and Alternatives 1, 2, and 4 because there was a need to conduct an analysis of these contracts on the coordinated long-term operation of the CVP and SWP.

EID 4: The 4,560 acre-feet of Ditch water rights is included in the upstream depletion analysis; and therefore is accounted for in the CalSim II modeling.

EID 5: The changes included in this comment have been incorporated into Appendix 5D in the Final EIS.

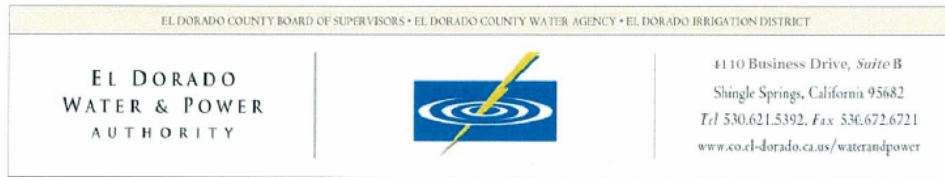
EID 6: As described in response to Comment EID 3, Reclamation has included assumptions for the El Dorado Irrigation District Warren Act contract and El Dorado County Water Agency CVP water service contract in Alternatives 3 and 5 to provide an analysis of implementation of these contracts with the coordinated long-term operation of the CVP and SWP. However, during the review of the numerical modeling analyses used in this EIS, it was discovered that the demands for the El Dorado Irrigation District Warren Act contract were not included in the CalSim II modeling analysis for Alternatives 3 and 5 as presented in Chapters 5 through 21. A sensitivity analysis using the CalSim II model to compare the results of the analysis with and without these demands is presented in Appendix 5B of this EIS for Alternatives 3 and 5. The results of the sensitivity analysis have been used in conjunction with the results presented in Chapters 5 through 21 to analyze the effects of including the CVP Warren Act contract for El Dorado Irrigation District in Alternatives 3 and 5, as described in Sections 3.4.6 and 3.4.7 of Chapter 3, Description of Alternatives, and Section 5.4.3 of Chapter 5, Surface Water Resources and Water Supplies.

The Preferred Alternative is described in Section 1.5 of Chapter 1, Introduction, of the Final EIS.

EID 7: The No Action Alternative and Alternative 5 included an assumption that either the Temperature Control Device (TCD), or equivalent actions, would be implemented to conserve the cold water pool in Folsom Lake in accordance with the 2009 NMFS BO. It is recognized that based upon recent studies, the TCD for EIS deliveries may or may not be required for long-term operations to conserve the cold water pool, and that future studies will be completed to finalize decisions

- 1 related to specific operations and any necessary facilities. Therefore, the fisheries
2 analysis in Chapter 9, Fish and Aquatic Resources, assumes that the cold water
3 pool is conserved without specifying the methodology used by El Dorado
4 Irrigation District under the No Action Alternative and Alternative 5.
- 5 The discussion in the Executive Summary and Chapter 3, Description of
6 Alternatives, indicate that Action II.3 of the 2009 NMFS BO is only included in
7 the No Action Alternative and Alternative 5. The text under Section 3.3.3 of
8 Chapter has been expanded to specifically indicate which actions under the
9 biological opinions are not included under the Second Basis of Comparison; and
10 therefore, by definition of the alternatives, not included in Alternatives 1, 3, and 4.
- 11 The discussion in Chapter 9, Fish and Aquatic Resources, has been expanded to
12 specifically provide more details in the text of each alternative related to this
13 analysis.
- 14 **EID 8:** Comment noted.

1 **1C.1.6 El Dorado Water and Power Authority**



September 24, 2015

Mr. Ben Nelson,
Natural Resources Specialist
Bureau of Reclamation, Bay-Delta Office
801 I Street, Suite 140
Sacramento, CA 95814-2536

Subject: El Dorado Water & Power Authority (EDWPA) Comments

Dear Mr. Nelson:

This letter summarizes EDWPA comments to the Bureau of Reclamation (Reclamation) Draft Environmental Impact Statement for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project (DEIS). Comments relate to EDWPA's pending filed petitions with the SWRCB for partial assignment of State Filed Applications 5644 and 5645, and accompanying applications allowing for the total withdrawal and use of 40,000 acre-feet per year from the American River watershed, as is commonly referred to as the "EDWPA Water Reliability Project" (formally the Supplemental Water Rights Project).

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Comment. Section 3.5 *Assumptions for Cumulative Effects Analysis* of the DEIS correctly includes the El Dorado Water & Power Authority's Water Reliability Project (Section 3.5.1.6 *El Dorado Water and Power Authority Supplemental Water Rights Project*) as a reasonably foreseeable future action included in the cumulative effects analysis. The allocation of 40,000 AFA should be included in the No Action Alternative and assumed under all other alternatives in the DEIS. The EDWPA Water Reliability Project with the full diversion of 40,000 AFA needs to be clearly identified and incorporated into Reclamation's ROD, regardless of which alternative or combination of alternatives Reclamation selects.

EDWPA
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Appendix 1C: Comments from Regional and Local Agencies and Responses

El Dorado Water & Power Authority (EDWPA) Comments
Mr. Ben Nelson,
Natural Resources Specialist
September 24, 2015
Page 2

Thank you for your consideration. EDWPA is prepared to provide additional information as necessary to further support our comments. Please contact me directly at ken.payne@edcgov.us or (916) 425-0734.

Sincerely,



Kenneth V. Payne, P.E.
Interim Executive Director
El Dorado Water & Power Authority

cc: Mr. Jim Abercrombie, General Manager, El Dorado Irrigation District
Mr. Brian Veerkamp, Chair, El Dorado County Board of Supervisors
Mr. Ron Milligan, Regional Operations Manager, Bureau of Reclamation
Mr. Drew Lessard, Area Manager, Bureau of Reclamation
Mr. Rick Woodley, Regional Resources Manager, Bureau of Reclamation
Craig Muehlberg, Deputy Area Manager, Bay-Delta Office

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2 **1C.1.6.1 Responses to Comments from El Dorado Water and Power**
3 **Authority**

4 **EDWPA 1:** Comment noted.

5 **EDWPA 2:** Specific implementation plans and approvals for the El Dorado
6 Water and Power Authority Water Reliability Project were not finalized at the
7 time of the publication of the Notice of Intent for this EIS in March 2012.
8 Therefore, these deliveries were not included in the No Action Alternative or any
9 of the alternatives. This water service contract has been included in cumulative
10 effects analyses of the EIS. Results of the impact analysis, including
11 consideration for cumulative effects, for all of the alternatives will be considered
12 by Reclamation during preparation of the Record of Decision.

1 **1C.1.7 Cities of Folsom and Roseville and San Juan Water District**



September 29, 2015

Mr. Ben Nelson
Bureau of Reclamation
801 I Street, Suite 140
Sacramento, CA 95814-2536

BY U.S. MAIL AND E-MAIL TO
bcnelson@usbr.gov

Re: Comments on Draft Environmental Impact Statement for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project

Dear Mr. Nelson:

This letter presents comments by our agencies on the Bureau of Reclamation's Draft Environmental Impact Statement for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project ("DEIS"). We incorporate the comments in the analysis prepared by Bartkiewicz, Kronick & Shanahan, P. C. (Attachment A) and the technical memorandum prepared by MBK Engineers (Attachment B).

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As discussed in more detail in the attached comments, the DEIS should be revised and additional analysis should be conducted before Reclamation adopts a Final Environmental Impact Statement ("FEIS") for these actions.

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We are also concerned that the DEIS shows significant impacts to Folsom Reservoir storage, which our region is dependent upon for our water needs. These impacts include reducing the probability that American River Region municipal and industrial contractors like our agencies will receive full allocations from the CVP from approximately 50 percent to 30 percent of all years, while increasing the probability we will receive only 50 percent allocations from approximately 5 percent to 10 percent of all years. The DEIS also shows reduced Folsom Reservoir carryover storage, which will increase the likelihood of extreme shortage conditions at Folsom Reservoir.

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We look forward to your responses to these comments.

Very truly yours,

CITY OF FOLSOM

By: Marcus Yasutake
Marcus Yasutake
Environmental and Water Resources
Director

CITY OF ROSEVILLE

By: Richard D. Plecker
Richard Plecker
Director, Environmental Utilities

SAN JUAN WATER DISTRICT

By: Shauna Lorance
Shauna Lorance
General Manager

Encls.

ATTACHMENT A

1

BARTKIEWICZ, KRONICK & SHANAHAN

PAUL M. BARTKIEWICZ
RICHARD P. SHANAHAN
ALAN B. LILLY
RYAN S. BEZERRA
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Of Counsel
STEPHEN A. KRONICK

September 29, 2015

Mr. Marcus Yasutake
Environmental and Water Resources Director
City of Folsom
50 Natoma Street
Folsom, CA 95630

Mr. Richard Plecker
Director, Environmental Utilities
City of Roseville
2005 Hilltop Circle
Roseville, CA 95747

Ms. Shauna Lorange
General Manager
San Juan Water District
9935 Auburn-Folsom Road
Granite Bay, CA 9574

Dear Mr. Yasutake, Mr. Plecker, and Ms. Lorange:

This letter presents the analysis prepared by Bartkiewicz, Kronick & Shanahan, P. C. to assist your agencies when commenting on the Draft Environmental Impact Statement for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project ("DEIS") prepared by the Bureau of Reclamation ("Reclamation").

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As discussed further below, the DEIS requires revisions and additional analyses before Reclamation adopts a Final Environmental Impact Statement for these proposed actions. The DEIS incorrectly defines the No Action Alternative, which renders analysis in the DEIS incorrect and leads Reclamation to not propose required mitigation measures. The hydrologic analysis in the DEIS also does not account for the legal requirements that protect the American River Region and does not adequately analyze impacts to Folsom Reservoir from implementation of the proposed actions.

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1. The DEIS Incorrectly Defines the No Action Alternative and, As a Result, Does Not Comply with the Ninth Circuit's Direction to Reclamation to Prepare an EIS that Analyzes the Human and Environmental Costs of Implementing the Biological Opinions' Reasonable and Prudent Alternatives

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Under the National Environmental Policy Act ("NEPA"), each federal agency must prepare a detailed environmental impact statement ("EIS") for any "major Federal action[] significantly affecting the quality of the human environment." (42 U.S.C. § 4332, subd. (2)(c).) The EIS must include "the alternative of no action." (40 C.F.R. § 1502.14(d); *American Rivers v. FERC* (9th Cir. 1999) 187 F.3d 1007, 1020.) The no action alternative represents the "status quo," defined as the continuation of existing policy and management direction without adoption

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of the proposed major Federal action. (*American Rivers, supra*, 187 F.3d at pp. 1020-1021.) The EIS also must explore and evaluate the proposed action and all reasonable alternatives, and include appropriate mitigation measures not already included in the proposed action or alternatives. (40 C.F.R. § 1502.14, subds. (a)-(c), (f).)

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On November 13, 2009, Judge Oliver Wanger entered a memorandum decision, which determined that Reclamation violated NEPA by failing to conduct an environmental assessment or prepare an EIS before provisionally accepting the United States Fish and Wildlife Service's 2008 delta smelt biological opinion ("2008 USFWS BiOp") and its proposed Reasonable and Prudent Alternative ("RPA"). The Ninth Circuit affirmed Judge Wanger's decision on this issue, concluding that Reclamation's provisional adoption of the RPA in the 2008 USFWS BiOp was a major federal action because adoption of the RPA would effect a change in the "status quo" for operation of the state and federal projects. (*San Luis & Delta-Mendota Water Authority v. Jewell* (2014) 747 F.3d 581, 646.) Regarding the purpose of requiring Reclamation to prepare an EIS, the Ninth Circuit's decision emphasized that the EIS prepared by Reclamation must disclose the effects of adopting the RPAs:

At this point, we can only speculate about what kind of significant effects will eventually result from implementation of the BiOp because Reclamation has not yet completed its EIS. But it is beyond dispute that Reclamation's implementation of the BiOp has important effects on human interaction with the natural environment. We know that millions of people and vast areas of some of America's most productive farmland will be impacted by Reclamation's actions. Those impacts were not the focus of the BiOp. In sum, we cannot reach an informed decision about the extent to which implementation of the BiOp is an environmental preservation action in the vein of *Douglas County* and *Drakes Bay Oyster* because we do not know how the action will impact the broader natural environment. We find no basis for exempting Reclamation from the EIS requirement. [Citation.] We recognize that the preparation of an EIS will not alter Reclamation's obligations under the ESA. *But the EIS may well inform Reclamation of the overall costs – including the human costs – of furthering the ESA.*

(*San Luis & Delta-Mendota Water Authority, supra*, 747 F.3d at 653 (italics added).)

Following these court orders, Reclamation prepared the DEIS. (DEIS, p. 1-9.) The DEIS states that its purpose is to "conduct a NEPA review to determine *whether the RPA actions cause a significant impact on the human environment.*" (DEIS, p. 2-2 (italics added).) In the DEIS, however, Reclamation defined the baseline, "No Action Alternative" conditions to include the RPA actions described in the 2008 USFWS BiOp RPA and the 2009 National Marine Fisheries Service ("NMFS") salmonid biological opinion ("2009 NMFS BiOp") in 2030. (DEIS, pp. 3-21 to 3-22.) The DEIS states Reclamation did this because Reclamation provisionally accepted and implemented the RPAs in the 2008 USFWS BiOp and 2009 NMFS BiOp prior to preparation of

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the DEIS. (DEIS, p. 3-22.) The DEIS also includes a Second Basis of Comparison that does not include implementation of the RPAs. (*Ibid.*)

By defining the No Action Alternative to include the major federal action that the courts ordered Reclamation to analyze, Reclamation has not complied with NEPA or these court orders. As required by the Ninth Circuit's decision, the purpose of requiring Reclamation to prepare an EIS was to inform Reclamation of the human and environmental costs of significantly changing the status quo for the state and federal water projects by adopting the RPAs. (*San Luis & Delta-Mendota Water Authority, supra*, 747 F.3d at 653.) The DEIS does not meet this requirement because it *assumes* the RPAs are part of the status quo by defining the No Action Alternative to include them. This flaw affects the DEIS's analysis, because it assumes that the status quo includes incurring the significant human and environmental costs of implementing the RPAs, and then the DEIS proceeds to analyze the five alternatives against this assumption. This is the opposite of the analysis required by NEPA and ordered by the Ninth Circuit's decision.

The DEIS attempts to address this issue by including a "Second Basis of Comparison," which "represents a condition in 2030 without implementation of the 2008 USFWS BO and 2009 NMFS BO," and then by also comparing the other alternatives to this basis of comparison. (DEIS, p. 3-3.) However, this analytical approach does not satisfy the Ninth Circuit's decision, because the DEIS does not describe the incremental changes from the Second Basis of Comparison to the alternatives as impacts of the proposed actions, and, as a result, the DEIS does not consider whether mitigation measures are needed to address the impacts of the alternatives when compared to the Second Basis of Comparison. Instead, the inclusion of the RPAs in the No Action Alternative leads the DEIS to improperly conclude that no mitigation is necessary for the adoption of the RPAs. If the DEIS had properly included adoption of the RPAs as an alternative, rather than as part of the No Action Alternative, then the DEIS would have been required to include appropriate mitigation measures to address the effects of the implementing the RPAs. (40 C.F.R. § 1502.14, subd. (f).) Instead, the DEIS assumes implementation of the RPAs and fails to include appropriate mitigation measures to address their effects. (See, e.g., DEIS, pp. 5-237 to 5-261 (failing to include mitigation for effects on surface water of implementing the RPAs).)

2. Numerous Legal Requirements Protect the American River Region's Interests from Being Adversely Impacted by Reclamation's and DWR's Operation of the Projects

Some of the oldest water rights in California concern the American River and are held by agencies in this region, which – unlike other regions of California – is solely dependent on its local water sources. For example, the City of Folsom and San Juan Water District ("SJWD") hold water rights that date to the 1850s. To obtain the water rights needed for the CVP Folsom Unit, and to be authorized to proceed to construct and operate this Unit, Reclamation was required to sign several settlement contracts concerning water supplies deriving from the

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American River. Those settlement contracts include contracts now held by the Cities of Folsom and Sacramento and SJWD.

In addition, when Reclamation applied to the then-State Water Rights Board ("SWRB") for its water-right permits for the CVP's Folsom Unit, numerous agencies in this region had pending applications for American River water rights. These agencies included the City of Roseville and predecessors of SJWD. In its 1958 decision that issued the Folsom Unit's water-right permits to Reclamation, Decision 893, the SWRB imposed on those permits a term – Term 14 – to protect those local applicants:

Deliveries of water under permits issued pursuant to Application 13370 and 13371 shall be limited to deliveries for beneficial use within Placer, Sacramento and San Joaquin Counties and shall not be made beyond the westerly or southerly boundaries thereof, except on a temporary basis, until the needs of those counties, present or prospective, are fully met provided, however, that agreements in accordance with Federal Reclamation laws between permittee and parties desiring such service within said counties are executed by July 1, 1968.

The 1968 deadline was extended to December 31, 1975 under agreements signed by Reclamation. (Decision 1356, pp. 7-8; Decision Amending And Affirming As Amended, Decision 1356, p. 1 (1970).)

The City of Roseville, SJWD, Placer County Water Agency and the Sacramento Municipal Utility District signed CVP water-service contracts to which Term 14 applies. (Term 14 does not apply to the Reclamation contracts under which the City of Folsom receives water.) Term 14 requires Reclamation to operate the CVP to ensure water-service contract deliveries to these agencies consistent with the intent the SWRB stated in Decision 893:

Permits are being issued to the United States to appropriate enough American River water to adequately supply the applicants naturally dependent on that source and availability of water to such applicants is reasonably assured by the terms to be contained in the permits to be issued to the United States restricting exportation of water under those permits insofar as exportation interferes [*sic*] with fulfillment of needs within Placer, Sacramento and San Joaquin Counties. Other applicants in more remote areas must if necessary seek water from other sources.

(Decision 893, p. 54.)

Besides these requirements that apply specifically to the CVP's Folsom Unit, California's area-of-origin laws also require Reclamation to operate the CVP to ensure water supplies for this region. For example, Water Code section 11460 – which applies to the CVP through Water Code section 11128 – states (*italics added*):

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In the construction *and operation* by the department of any project under the provisions of this part a watershed or area wherein water originates, or an area immediately adjacent thereto which can conveniently be supplied with water therefrom, shall not be deprived by the department directly or indirectly of the prior right to all of the water reasonably required to adequately supply the beneficial needs of the watershed, area, or any of the inhabitants or property owners therein.

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Federal law requires Reclamation to respect these state law provisions and water right permit terms in its operation of the CVP. Section 8 of the Reclamation Act of 1902 provides:

Nothing in [the Reclamation Act] shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or *distribution* of water used in irrigation, or any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of [the Reclamation Act], shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any landowner, appropriator, or user of water in, to, or from any interstate stream or the waters thereof.

(43 U.S.C., § 383 (italics added).)

In *California v. United States*, the United States Supreme Court held that section 8 requires Reclamation to show substantial deference to state laws unless such laws are “directly inconsistent with congressional directives.” ((1978) 438 U.S. 645, 678.) Specifically, the Supreme Court concluded Reclamation must comply with conditions imposed by the SWRCB in its operations of New Melones Dam, which is part of the CVP. In reaching this conclusion, the Supreme Court traced the historical relationship between federal government and the states in the reclamation of arid lands, stating that through this relationship “runs the consistent thread of purposeful and continued deference to state water law by Congress.” (*Id.* at p. 653.)

Notwithstanding these legal requirements for the CVP’s operations, as explained below, the DEIS indicates that Reclamation would not comply with these legal requirements.

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3. The DEIS Shows Reclamation’s Operation of the Projects Would Not Comply with the Numerous Legal Requirements that Protect the American River Region’s Interests

As discussed in more detail in the technical comments prepared for your agencies by MBK Engineers, the DEIS shows implementation of the RPAs would significantly impact Folsom Reservoir storage. The DEIS’s hydrologic modeling states that implementing the RPAs would reduce the probability of American River Region municipal and industrial (“M&I”) contractors receiving full allocations from the CVP from approximately 50 percent to 30 percent

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of all years, while the probability of receiving only 50 percent allocations would increase from approximately 5 percent to 10 percent of all years. The DEIS also states that implementation of the RPAs would result in reduced Folsom Reservoir carryover storage. (DEIS, pp. 5-93 to 5-95.)

The DEIS states that Reclamation will place a disproportionate burden on Folsom Reservoir by using it as a “first responder” to meet Delta water quality standards.

Folsom Reservoir also is operated by Reclamation to release water to meet Delta salinity and flow objectives established to improve fisheries conditions. Weather conditions combined with tidal action and local accretions from runoff and return flows can quickly affect Delta salinity conditions, and require increases in spring Delta inflow to maintain salinity standards, as described in Appendix 3A, No Action Alternative: Central Valley Project and State Water Project Operations. In accordance with Federal and state regulatory requirements, the CVP and SWP are frequently required to release water from upstream reservoirs to maintain Delta water quality. Folsom Lake is located closer to the Delta than Lake Oroville and Shasta Lake; therefore, the water generally is first released from Folsom Lake. Water released from Lake Oroville and Shasta Lake generally reaches the Delta in approximately three and four days, respectively. As water from the other reservoirs arrives in the Delta, Folsom Reservoir releases can be reduced.

(DEIS, pp. 5-32 to 5-33.)

This description of planned CVP and State Water Project (“SWP”) operations demonstrates that Reclamation’s proposed actions would violate the legal protections that apply to the American River region. This portion of the DEIS states that, for operational convenience, Reclamation plans to impose a disproportionate burden on the region for meeting Delta water quality standards, which are intended to address Delta-export operations, not operations necessary to meet water-supply or environmental requirements in the American River region.

Because the alternatives discussed in the DEIS are inconsistent with the legal requirements protecting the American River region’s water supplies, the DEIS should include at least one alternative that would comply with the settlement contracts held by contractors in this region, the terms in Reclamation’s water-right permits for Folsom Dam and Reservoir, and California’s area of origin protections.

4. The DEIS Does Not Fully Analyze Impacts Related to Folsom Reservoir Storage

As discussed in more detail in the technical memorandum prepared by MBK Engineers, the DEIS’s hydrological analysis does not accurately analyze how the CVP and SWP would be operated with the combined effects of climate change and multi-year droughts, and, as a result,

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does not properly analyze the impacts of the proposed action on Folsom Reservoir storage and deliveries to American River Region M&I contractors.

The DEIS acknowledges that its analysis and conclusions are probably inaccurate during extremely dry conditions that come with multi-year droughts:

Under extreme hydrologic and operational conditions where there is not enough water supply to meet all requirements, CalSim II utilizes a series of operating rules to reach a solution to allow for the continuation of the simulation. It is recognized that these operating rules are a simplified version of the very complex decision processes that CVP and SWP operators would use in actual extreme conditions. Therefore, *model results and potential changes under these extreme conditions should be evaluated on a comparative basis between alternatives and are an approximation of extreme operational conditions*. As an example, CalSim II model results show simulated occurrences of extremely low storage conditions at CVP and SWP reservoirs during critical drought periods when storage is at dead pool levels at or below the elevation of the lowest level outlet. Simulated occurrences of reservoir storage conditions at dead pool levels may occur coincidentally with simulated impacts that are determined to be potentially significant. When reservoir storage is at dead pool levels, there may be instances in which flow conditions fall short of minimum flow criteria, salinity conditions may exceed salinity standards, diversion conditions fall short of allocated diversion amounts, and operating agreements are not met.

(DEIS, p. 5-61 (italics added).)

Regarding climate change, the DEIS does not disclose the proposed alternatives' impacts against baseline conditions without projected climate change. Instead, all of the DEIS's alternatives include the projected future impacts of climate change in the 2030 timeframe. (DEIS, p. ES-7.) This makes it impossible for reviewers to segregate impacts that are predicted to result from climate change from the impacts that would occur from implementation of the proposed alternatives. Furthermore, as discussed in MBK's technical memorandum, it is not possible to know whether future climate change will occur exactly as projected in the DEIS's single climate change scenario. Therefore, the DEIS does not adequately inform the public of the proposed alternatives' impacts, because the lack of an analysis of the proposed alternatives' impacts without climate change obscures how the state and federal projects are likely to operate if climate change does not occur exactly as projected in the DEIS.

The DEIS also does not adequately analyze the impacts of, and potential mitigation for, water shortages in the American River region during multi-year droughts. As discussed in the following paragraphs, the DEIS should include further analysis of the potential impacts that water shortages would have on groundwater storage, socioeconomics and public health.

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Regarding the impacts to groundwater levels from the No Action Alternative, the DEIS concludes that, despite reduced water supplies from the CVP and SWP, groundwater levels would be similar in the Sacramento Valley Groundwater Basins. (DEIS, p. 7-121.) However, the DEIS should separately analyze groundwater impacts to the Sacramento Valley's subbasins to account for the impacts of water shortages in particular areas, including the American River region. Groundwater resources historically were overdrawn in northern Sacramento County and have been recovering largely because surface water from Folsom Reservoir and the American River have been made more widely available in this region. Significant reductions in future Folsom Reservoir storage levels, resulting in reduced surface water deliveries to American River Region M&I contractors, would increase groundwater withdrawals and would cause drawdowns in groundwater supplies. These increased withdrawals could further impact groundwater resources, because contamination from previous industrial and military operations is present in Sacramento County aquifers and could migrate as a result of increased demands on those groundwater aquifers.

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The DEIS also does not adequately analyze the socioeconomic impacts resulting from severe water shortages. The DEIS's analysis of the socioeconomic impacts of regional changes to M&I water supplies assumes that M&I contractors would be able to make up for shortages using alternate stored surface and groundwater supplies, increased groundwater pumping and transfers. (DEIS, p. 19-40.) However, such supplies are limited for agencies like ours, which cannot be served economically with pumped groundwater. For example: (1) the City of Roseville can pump groundwater from the western portion of its service area to a portion of the rest of its service area, but not all of it; (2) San Juan Water District can rely on some of its retail suppliers using groundwater, but groundwater cannot be used throughout the District's service area; and (3) the City of Folsom has little ability to serve groundwater in much of its existing service area. Furthermore, because your agencies divert surface water at Folsom Reservoir, and there are few opportunities for transfers from upstream water users, the DEIS's assumption that your agencies could alleviate significant water shortages through transfers is not supported.

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The DEIS also does not adequately analyze impacts to public health from the possible lack of M&I water supplies sufficient to meet minimal public health and safety needs during severe water shortages. As the DEIS acknowledges, during the current drought, the cutbacks in CVP and SWP allocations have been the most stringent in history, with CVP M&I water service contractors receiving only 50 percent of the amounts of their historical use. (DEIS, pp. 18-2 to 18-3.) As discussed above, implementation of the RPAs will continue to reduce M&I deliveries. During multi-year droughts, this may lead to the physical unavailability of water from the M&I intake at Folsom Reservoir. (DEIS, p. 5-30.) That intake would become dry if the reservoir's water level were to decline to about 320 feet above mean sea level, which would be when there is about 100,000 acre-feet (AF) of water stored there. Several agencies that use the intake would begin to have serious water-supply problems at reservoir storage volumes well above 100,000 AF.

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Appendix 1C: Comments from Regional and Local Agencies and Responses

Mr. Marcus Yasutake
Mr. Richard Plecker
Ms. Shauna Lorance
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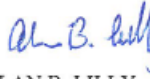
Despite the DEIS's own statements regarding the potential impacts on your region from implementation of the RPAs during multi-year droughts, the DEIS states that it is too "difficult" to identify local public health and safety issues associated with severe water shortages. (DEIS, p. 18-4.) The DEIS should provide an analysis of potential impacts to public health and safety associated with long-term reductions in CVP M&I deliveries, and especially those impacts associated with extreme shortages during multi-year droughts. This analysis is necessary to comply with the Ninth Circuit's statement that the DEIS must inform Reclamation of the human cost of implementing the RPAs. (*San Luis & Delta-Mendota Water Authority, supra*, 747 F.3d at 653 (italics added).)

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For the reasons discussed in this letter, the DEIS should be revised and additional analyses should be conducted before Reclamation adopts a Final Environmental Impact Statement. The DEIS incorrectly defines the No Action Alternative, which renders analysis in the DEIS incorrect and leads Reclamation to not propose required mitigation measures. The hydrologic analysis in the DEIS also does not account for the legal requirements that protect the American River Region and does not adequately analyze impacts to Folsom Reservoir that would occur from implementation of the proposed actions.

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Very truly yours,



ALAN B. LILLY

ABL:tmo
8618/OCAP EIS/Public Review DEIS/L092915abl.doc

ATTACHMENT B

1



Water Resources • Flood Control • Water Rights

TECHNICAL MEMORANDUM

DATE: September 29, 2015

TO: Alan B. Lilly

FROM: Lee G. Bergfeld and Walter Bourez

SUBJECT: Technical Comments on Coordinated Long-Term Operation of the Central Valley Project and State Water Project Draft Environmental Impact Statement

This technical memorandum is a summary of MBK Engineers' (MBK) findings and opinions on the hydrologic modeling that the U.S. Bureau of Reclamation (Reclamation) performed for the draft environmental document for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project (LT Ops DEIS).

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This review focuses on water operations modeling using CalSim II. CalSim II is a computer program jointly developed by the California Department of Water Resources (DWR) and Reclamation. CalSim II presents a comprehensive simulation of State Water Project (SWP) and Central Valley Project (CVP) operations. CalSim II is widely recognized as the most prominent water management model in California, and it is generally accepted as a useful and appropriate tool for assessing the water delivery capability of the SWP and CVP. CalSim II estimates, for various times of the year, how much water will be diverted, how much will serve as instream flows, and how much will remain in reservoirs.

For the LT Ops DEIS, Reclamation applied CalSim II to analyze how CVP and SWP operations changed as a result of implementation of the Reasonable and Prudent Alternatives (RPAs) in the 2008 U.S. Fish and Wildlife Service (USFWS) Biological Opinion (BO) on Delta smelt and the 2009 National Marine Fisheries Service (NMFS) Biological Opinion on Chinook salmon. The coding and assumptions included in the CalSim II model drive the results. Data and assumptions, such as the amount of precipitation runoff at a certain measuring station or the demand for water by specific water users are input into the model. Criteria used to operate the CVP and the SWP (including regulatory requirements such as biological opinions) are included in model assumptions. Because of the volume of water controlled and delivered by the CVP and SWP, these operational criteria significantly influence model results. Additionally, operational logic is coded into CalSim II to simulate how DWR and Reclamation would operate the system under circumstances for which there are no regulatory or otherwise definitive rules, e.g. when to move water from storage in reservoirs upstream of the Delta to reservoirs downstream of the Delta. This attempt to simulate the logic sequence and relative weighting that the CVP and SWP operators use as part of their "expert judgment" is a critical element of CalSim II.

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Technical Comments on LT Ops DEIS

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The CalSim II model is the foundational model for analysis of the LT Ops DEIS, including effects and impacts analyses. Results from CalSim II are used to examine how water supply and reservoir operations are modified by the RPAs in both BOs and for each project alternative. CalSim II results are also used by subsequent models to determine physical and biological effects including water quality, water levels, water temperature, Delta flows, and fish response. Any errors or inconsistencies identified in the underlying CalSim II model are therefore present in subsequent analyses of environmental effects.

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The following sections provide our comments on CalSim II analysis conducted for the LT Ops DEIS (LT Ops DEIS Model).

Climate Change

Analysis presented in the LT Ops DEIS attempts to incorporate the effects of climate change at a future date of approximately 2025 (LT Ops DEIS, page 5A.A-27). The methodology followed in the LT Ops DEIS is the same as used in analysis for the Bay-Delta Conservation Plan DEIS/EIR and the California Water Fix Revised DEIS/EIR. Analysis for the LT Ops DEIS is focused on an Early Long-Term (ELT) condition, as simulated in several different Global Climate Models under a range of future emissions conditions. These different Global Climate Model results, which vary significantly in their depictions of future temperatures and precipitation, are analyzed to determine a central tendency used to represent a potential future condition. The central tendency prediction of changes in temperature and precipitation is downscaled from large spatial grids used in Global Climate Models and input to the Variable Infiltration Capacity (VIC) hydrology model to generate simulated natural stream flows. These climate-influenced simulated stream flows on a watershed scale are then used to determine fractional changes from the historical, observed inflow patterns in CalSim II. Changes are then applied to the monthly historical reservoir inflows in CalSim II to depict a future, climate-changed hydrology.

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Figure 1 illustrates the assumed average annual and monthly Folsom Reservoir inflows at the ELT condition, by water year type (historical Sacramento Valley Water Year Type), that were used for analysis of all alternatives in the LT Ops DEIS Model.

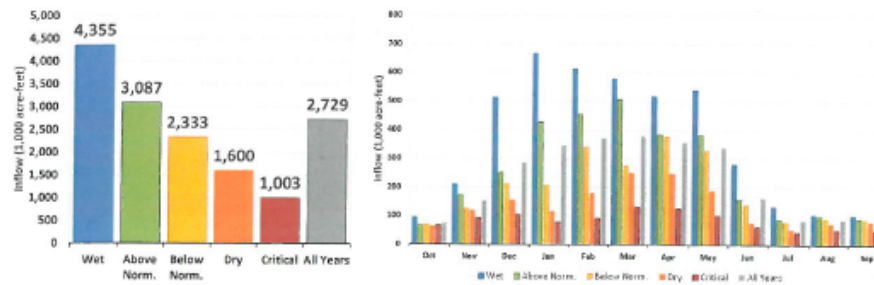


Figure 1: Average Annual and Monthly Inflow to Folsom in All Alternatives of LT Ops DEIS Model

Figure 2 shows the changes in the average annual and monthly Folsom inflows by water year type between the ELT condition used in the LT Ops DEIS Model and historically based inflows from a recent CalSim II study from Reclamation. The historically-based inflows were used for analysis of the CVP Municipal and Industrial (M&I) Water Shortage Policy Environmental Impact Statement released September 2015. Differences in Figure 2 show that while the average annual reduction in Folsom Reservoir inflow is only 9,000 acre-feet under the ELT assumptions, there are much higher reductions in drier year types, and seasonal shifts to higher inflows from November through March, and lower inflows from May through October.

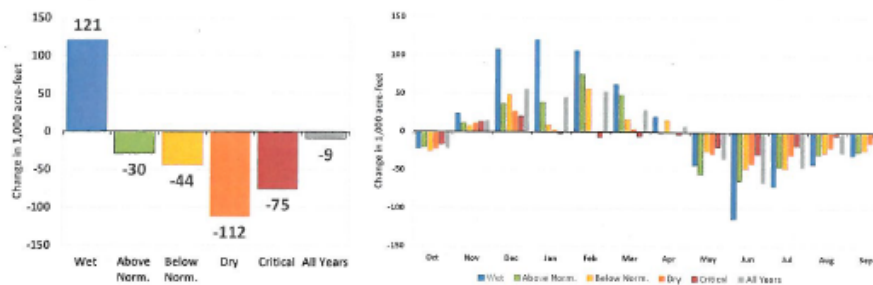


Figure 2: Average Annual and Monthly Change in Inflow to Folsom under ELT Climate Change Conditions included in All Alternatives of LT Ops DEIS Model

There is considerable uncertainty regarding the effects of climate change on future temperatures and precipitation. As described above, the LT Ops DEIS relied on one potential depiction of these effects. Analysis of only one potential future condition does not cover the range of potential future conditions and introduces inconsistent assumptions in the model. An example of these inconsistent assumptions occurs on the upper American River. The LT Ops DEIS assumed changes from historical inflow to Folsom based on potential change in future temperatures and precipitation and analysis with the VIC model to understand changes in natural stream flows. However, the American River watershed upstream from Folsom Reservoir is not

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expected to change in the same manner as a natural stream. There is significant storage capacity in Placer County Water Agency's (PCWA) Middle Fork Project and the Sacramento Municipal Utility District's (SMUD) Upper American River Project. Operations of these reservoirs directly affect Folsom inflow and operating criteria such as flood credit space. To produce acceptable modeling of Folsom Reservoir and the American River, there must be consistency in the hydrology used to model reservoirs upstream from Folsom and the hydrology used to model Folsom Reservoir. Changes in inflow and operations of these upstream projects should be considered to properly incorporate climate change into modeling of Folsom Reservoir. Alternatively, climate change analysis could be conducted as sensitivity analysis, as opposed to being included in all project alternatives. Standard practice for modeling CVP and SWP operations is to simulate the No Action and Project alternatives with historically-based hydrology. In our opinion, this is the preferred approach to avoid inconsistencies in model assumptions and over reliance upon results from one of many potential future climate-changed conditions.

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Additionally, in examining possible effects of climate change, it is not appropriate to assume that current project operations will remain static and not respond to climate change. The analysis for the LT Ops DEIS assumes continued operations of the CVP and SWP without adaptations. This approach produces results that are not useful for dealing with the complex problem of climate change because it does not reflect the way in which the CVP and the SWP would actually operate, whether or not the RPAs are implemented. We recommend a sensitivity analysis be conducted to develop a better understanding of the range of possible responses to climate change by the CVP and SWP, and the regulatory structures that dictate certain project operations.

Climate Change Assumptions Result in Unrealistic Operations

Review of model output for the LT Ops DEIS No Action Alternative (NAA) reveals that the model is operated beyond its usable range. The purpose of CalSim II is to simulate how the CVP and SWP systems would be operated to meet regulatory requirements and water delivery objectives based on a certain amount of precipitation and runoff. When the precipitation patterns and resultant runoff were changed for the LT Ops DEIS Model with climate change, the logic regarding how the system is operated to meet the regulatory and water delivery objectives was not changed. The net effect is that during certain periods of the model simulation neither the regulatory criteria nor the delivery objectives are met.

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With the predicted changes in precipitation and temperature implemented in the LT Ops DEIS Model, there is simply not enough water available in the simulation to meet all regulatory objectives and water user demands. Yet the LT Ops DEIS Model continues its normal routine until the modeled system essentially crashes and thus fails to meet its objectives. In this aspect, the LT Ops DEIS Model simply does not simulate reality. For example, if ELT conditions actually occur, the CVP and SWP would likely adapt to protect water supplies and the environment. Examples of adaptations to climate change would likely include: (1) updating operational rules regarding water releases for flood protection; (2) during severe droughts, emergency drought declarations could call for mandatory conservation, changes in some

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regulatory criteria, or even an inability to meet contractual obligations, similar to what has occurred during the current and previous droughts; and (3) if droughts become more frequent, the CVP and SWP would likely revisit the rules by which they allocate water during shortages and operate with lower deliveries during wetter years. The likelihood of an appropriate operational response to climate change is supported by the many modifications to CVP and SWP operations that were made during the winter and spring of 2014 and 2015 to respond to the current drought. Thus, while the LT Ops DEIS Model shows that difficult decisions will have to be made if ELT conditions occur, the LT Ops DEIS Model does not attempt to simulate the results of such decisions.

Under the climate change conditions, reservoir storage (particularly in the CVP system) is simulated to operate aggressively such that reservoirs are drawn down to an extremely low level. Simulated storage levels reach the model-defined dead pool, at which point no water can be released from reservoir storage – for fish, drinking water, or agriculture. CalSim II specifies dead pool in Folsom Reservoir as 90,000 acre-feet and storage reaches this level during approximately six percent of all years (see Figure 3). By comparison, since Folsom Reservoir became operational in 1955, the lowest storage level on record was 147,000 acre-feet at the end of September 1977. However, the LT Ops DEIS Model predicts that, with ELT climate change, reservoir storage will be approximately 90,000 acre-feet, nearly 40% lower than its historical low, during six percent of all years. Some municipalities, like the City of Folsom, the City of Roseville, and San Juan Water District, are almost entirely dependent on Folsom Reservoir releases for drinking water; and Folsom Reservoir's reaching 90,000 acre-feet could cut their municipal deliveries below the levels required to maintain public health and safety for over 500,000 people.

In reality, and to avoid such dire circumstances, the CVP and SWP would likely request that regulatory agencies modify the applicable standards so that the CVP and SWP could conserve storage. Conservation or rationing by water users would probably also occur. Similar steps were taken in spring 2014 and 2015 to reduce water diversions and reservoir releases for fishery needs and Delta requirements. Emergency measures such as these are not simulated in the model, so the LT Ops DEIS Model does not reflect reasonable future operations with climate change.

Modeling climate change, without adaptation measures, leads to results showing insufficient water supplies to meet all regulatory objectives and user demands. This modeling approach significantly limits the utility of the LT Ops DEIS Model results in analyzing the effects of implementing the RPAs, particularly during drought conditions. With future conditions modeled to be so dire, the modeled effects of the RPAs are reduced because it appears that conditions cannot get any worse; i.e., reservoir storage cannot be reduced below minimum levels. However, in reality, the future conditions will not be as depicted in the LT Ops DEIS Model. Operations during the current drought show that drawing reservoirs down to near minimum levels to meet regulatory and contractual requirements is not realistic. Instead, difficult decisions are made in an attempt to balance environmental conditions in reservoirs and rivers, while still meeting water supply needs. These real-world decisions create different environmental conditions than simulated in the LT Ops DEIS Model. Therefore, comparisons of

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results from alternatives simulated in the LT Ops DEIS Model do not capture the environmental effects during these drought periods. We recommend Reclamation, in cooperation with key agencies, develop more realistic operating rules for the hydrologic conditions expected over the next half-century, and incorporate those operating rules into any CalSim II model that includes climate change.

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Effects of the Biological Opinions

The LT Ops DEIS states Reclamation was ordered by the Ninth Circuit Court to prepare the EIS to “*determine whether the acceptance and implementation of the RPA actions cause a significant effect on the human environment*” (LT Ops DEIS page ES-6). The LT Ops DEIS No Action Alternative (NAA) includes implementation of the RPA actions in the simulated operations of the CVP and SWP. Effects from the implementation of the RPA actions on the American River Basin are shown by comparison of the NAA with the Second Basis of Comparison (SBC). Reclamation developed the SBC, which does not include RPA actions, in response to scoping comments, and to provide a basis of comparison to determine effects of implementing RPA actions.

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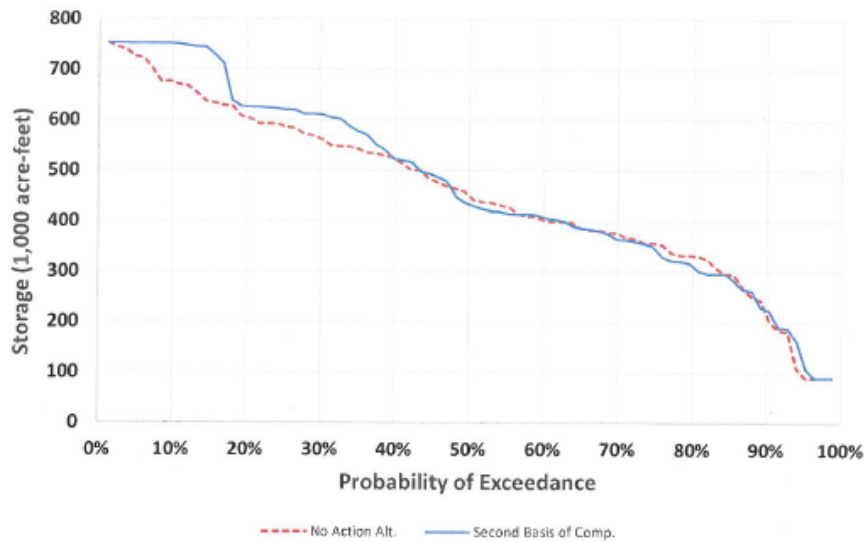
MBK previously analyzed the effects of implementing the 2008 USFWS and 2009 NMFS BOs on CVP and SWP operations without climate change. Overall, changes in simulated CVP/SWP operations contained in the LT Ops DEIS are generally consistent with previous studies conducted by MBK. Differences in the effects presented in the LT Ops DEIS, where they exist, are likely due to the inclusion of climate change.

An important assumption for the operation of Folsom Reservoir, as simulated for the LT Ops DEIS, is that both the NAA and the SBC include operations to meet the Lower American River Flow Management Standard (FMS). The FMS was one of the RPA actions in the 2009 NMFS BO; however, it also is included in the SBC. The inclusion of the FMS in both the NAA and SBC is important when comparing results of the two studies because none of the differences between the NAA and the SBC are the result of implementing the FMS. Additionally, the majority of the other RPA actions apply to areas outside of the American River Basin. Therefore, changes in Folsom Reservoir operations and deliveries in the American River Basin are a result of CVP operations to meet RPA actions outside of the basin.

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For water users in the American River Basin, potential effects on the human environment are focused on the operation of Folsom Reservoir and water deliveries. Figure 3 illustrates the probability of exceedance for end-of-September (carryover) storage in Folsom Reservoir for the NAA with implementation of the BO RPA actions and the SBC without implementation of the BO RPA actions.

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Figure 3: Probability of Exceedance for Folsom Reservoir End-of-September Storage

Results presented in Figure 3 illustrate one of the most significant effects of implementing the BO RPA actions on Folsom Reservoir. Folsom Reservoir carryover storage in wetter year types, i.e. below approximately the 40 percent exceedance level, is reduced as a result of additional releases to meet the fall X2 RPA action in the 2008 USFWS BO. In many years when Folsom Reservoir carryover storage is high, the reservoir will fill and spill in subsequent years. However, there are exceptions. Two examples included in the analysis are the years that preceded the 1976-1977 drought and the 1987-1992 drought. Both 1975 and 1986 are classified as wet water years by the Sacramento Valley Water Year Index and in both years carryover storage in Folsom Reservoir was reduced in the NAA by releases to meet the fall X2 RPA. Overall, the LT Ops DEIS lacks sufficient detail describing the effects of the different alternatives on CVP/SWP operations and the effects of implementing the BOs on the human environment. We recommend that more description of the operational changes and interpretation of the model results be included in the final EIS.

Changes in Folsom Reservoir storage can result in changes in CVP North-of-Delta (NOD) M&I water service contract allocations. Lower allocations result in less water deliveries to American River CVP contractors. Figure 4 illustrates the probability of exceedance for CVP NOD M&I allocations for the NAA and the SBC.

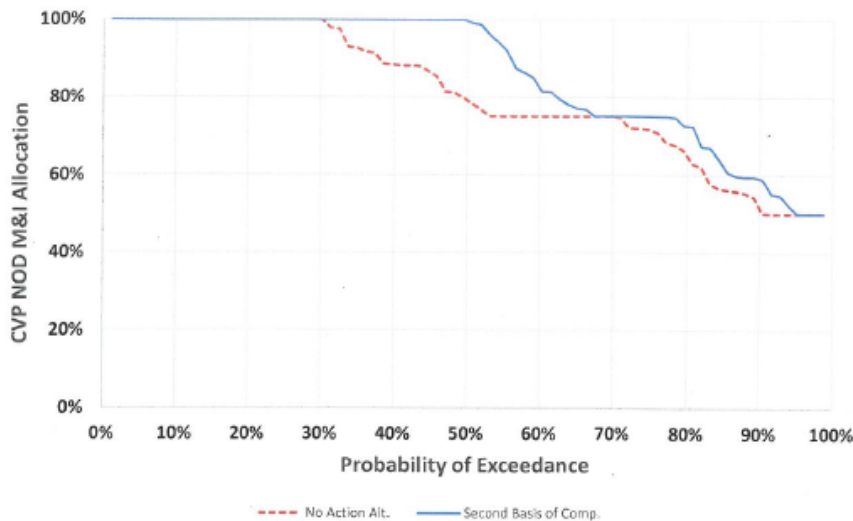
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Figure 4: Probability of Exceedance for CVP NOD M&I Water Service Contract Allocations

Allocations illustrated in Figure 4 show a reduction in water available under CVP contracts as a result of implementing RPA actions contained in the BOs. The probability of receiving full allocations is reduced from approximately 50 percent to 30 percent, while the probability of receiving a 50 percent allocation is increased from approximately 5 percent to 10 percent. Changes in allocations are one parameter to understand the effects of implementing the BOs on American River water users. However, as described above, in the six percent of years when model results show that Folsom Reservoir would be drawn down to dead pool in both the NAA and SBC, there is not enough water in the simulation to meet the model allocations.

American River Basin Demands

Demand assumptions in CalSim II for a future level of development in the American River basin can vary. Table 1 is a summary of the average annual demands, by water purveyor, assumed in all alternatives for the LT Ops DEIS.

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Table 1: Summary of American River Basin Water Purveyor Demands in LT Ops DEIS Model

Water Purveyor	Annual Demand (1,000 acre-feet)
Placer County Water Agency	65.0
PCWA – CVP Contract	35.0
City of Folsom	27.0
City of Folsom – CVP Contract	7.0
Folsom Prison	5.0
San Juan Water District (SJWD)	33.0
SJWD from PCWA	25.0
SJWD – CVP Contract	24.2
City of Roseville – from PCWA	30.0
City of Roseville – CVP Contract	32.0
Sac. Suburban Water District – from PCWA	0.0
El Dorado Irrigation District (EID)	0.0 or 17.0*
EID – CVP Contract	7.55
El Dorado County Water Agency (EDCWA) – CVP Contract	0.0 or 15.0*
So. Cal. Water Company/Arden Cordova Water Service	5.0
California Parks and Recreation	5.0
Sacramento Municipal Utilities District (SMUD)	15.0
SMUD – CVP Contract	30.0
City of Sacramento (Fairbairn and Sacramento River)	311.8
Carmichael Water District	12.0
Sacramento County Water Agency Total (SCWA)	109.7
SCWA – CVP Contract	45.0
East Bay Municipal Utilities District – CVP Contract	Up to 112.0

* These demands for EID and EDCWA are only included in sensitivity analyses performed for Alternatives 3 and 5.

The majority of the demands summarized in Table 1 approximate a buildout level of demand. One exception to this is for Sacramento Suburban Water District (Sac Suburban). There is no demand/diversion simulated for Sac Suburban for any of the alternatives evaluated in the LT Ops DEIS.

American River Basin Water Budget

Appendix 5B of the LT Ops DEIS describes the sensitivity analysis that was conducted to evaluate the effects of additional diversions from Folsom Reservoir. Alternatives 3 and 5 are described to include a potential future Warren Act Contract between Reclamation and El Dorado Irrigation District (EID) for the use of Folsom Reservoir to convey 17,000 acre-feet annually, and a M&I water service contract with El Dorado County Water Agency (EDCWA) for up to 15,000 acre-feet annually, subject to CVP M&I allocations. These two additional demands for water from Folsom Reservoir were not included in the modeling for Alternative 3 or Alternative 5. However, additional simulations were performed for the LT Ops DEIS for both alternatives that included the additional demands. The LT Ops DEIS states comparisons of these additional simulations that include the EID and EDCWA demands can be made to results for Alternatives 3

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and 5, which do not include these demands, to understand the changes as a result of the additional 32,000 acre-feet of demand.

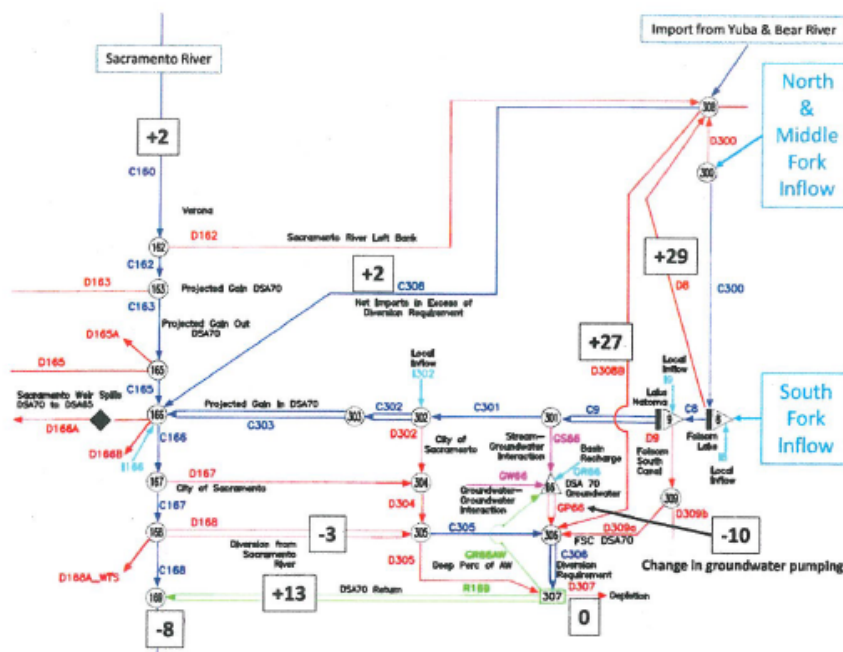
Review of these sensitivity studies shows an error in simulating the additional diversions in the context of the CVP/SWP system. Model studies correctly simulate the additional diversion of water from Folsom Reservoir, an annual average of approximately 17,000 acre-feet to EID and 12,000 acre-feet to EDCWA, after adjustment for CVP M&I allocations. Model studies also include an assumption that approximately 46 percent of the additional diversion returns to the system. The return flow appears to represent the monthly indoor M&I use of the additional demand being met from the surface water diversion. However, there is no additional depletion from the American River Basin, or Depletion Study Area (DSA) 70. Instead, the additional diversion from Folsom Reservoir results in: (1) increased return flows above the specified 46 percent, (2) reductions in other surface water diversions, and (3) a reduction in groundwater pumping within DSA 70. This change in groundwater pumping within DSA 70 is not a correct response of the model because the additional surface water diverted to EID and EDCWA under these two contracts would not be used to meet demands within DSA 70 that are currently being met from groundwater. Figure 5 illustrates the average annual change in different flow arcs in the CalSim II representation of the American River Basin/DSA 70.

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The result of these errors is to underestimate the potential environmental effects of these additional demands in Alternatives 3 and 5. Figure 5 illustrates that the reduction in Delta inflow is approximately 8,000 acre-feet on an average annual basis as a result of meeting up to 32,000 acre-feet of additional demand. Return flows are approximately 13,000 acre-feet of the 29,000 acre-feet diverted from Folsom Reservoir. Therefore, the remainder of the water should be depleted from the DSA 70 water budget, resulting in an average annual reduction in Delta inflow of approximately 16,000 acre-feet. However, instead of being depleted, the additional diversions from Folsom Reservoir increase return flow to the Sacramento River through arc C308, decrease Sacramento River diversions through arc D168, and reduce groundwater pumping through arc GP66. None of these changes should occur as a result of diverting additional water from Folsom Reservoir for delivery within EID and/or EDCWA. Additionally, there is no additional depletion of water from DSA 70 through arc D307. It is expected that some portion of the additional diversions under the two contracts would be depleted from the system. These model errors affect only the analysis of Alternatives 3 and 5 as presented in the sensitivity studies in Appendix 5B.

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Lee Bergfeld, P.E.

LB/jw
1978-3/TECH MEMO COMMENTS ON LT OPS DEIS 2015-09-29

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2 **1C.1.7.1 Responses to Comments from City of Folsom, City of Roseville,**
3 **and San Juan Water District**

4 **Folsom Roseville SJWD 1:** Comment noted.

5 **Folsom Roseville SJWD 2:** Reclamation has modified the Final EIS in response
6 to comments; and will use the Final EIS in the development of the Record of
7 Decision. On October 9, 2015, the District Court granted a very short time
8 extension to address comments received during the public review period, and
9 requires Reclamation to issue a Record of Decision on or before
10 January 12, 2016. This current court ordered schedule does not provide sufficient
11 time for Reclamation to include additional alternatives, which would require
12 recirculation of an additional Draft EIS for public review and comment, nor does
13 Reclamation believe additional analysis is required to constitute a sufficient EIS.
14 Reclamation is committed to continue working toward improvements to the
15 USFWS and NMFS RPA actions through either the adaptive management
16 process, Collaborative Science and Adaptive Management Program (CSAMP)
17 with the Collaborative Adaptive Management Team (CAMT), or other similar
18 ongoing or future efforts.

19 **Folsom Roseville SJWD 3:** This comment is consistent with the information in
20 the EIS.

21 **Folsom Roseville SJWD 4:** Comment noted.

22 **Folsom Roseville SJWD 5:** Please see response to Comment Folsom Roseville
23 SJWD 2.

Folsom Roseville SJWD 6: The CVP and SWP operations prioritize meeting federal and state regulatory requirements and deliveries to water rights holders, including the City of Sacramento, prior to deliveries of water to CVP and SWP water contractors. The modeling analyses presented in the EIS include these prioritizations for long-term operation of the CVP and SWP without inclusion of changes that could be developed for specific extreme flood or drought events.

Folsom Roseville SJWD 7: As described in Section 3.3, Reclamation had provisionally accepted the provisions of the 2008 USFWS BO and 2009 NMFS BO, and was implementing the BOs at the time of publication of the Notice of Intent in March 2012. Under the definition of the No Action Alternative in the National Environmental Policy Act regulations (43 CFR 46.30), Reclamation's NEPA Handbook (Section 8.6), and Question 3 of the Council of Environmental Quality's Forty Most Asked Questions, the No Action Alternative could represent a future condition with "no change" from current management direction or level of management intensity, or a future "no action" conditions without implementation of the actions being evaluated in the EIS. The No Action Alternative in this EIS is consistent with the definition of "no change" from current management direction or level of management. Therefore, the RPAs were included in the No Action Alternative as Reclamation had been implementing the BOs and RPA actions, except where enjoined, as part of CVP operations for approximately three years at the time the Notice of Intent was issued (2008 USFWS BO implemented for three years and three months, 2009 NMFS BO implemented for two years and nine months).

As described in Section 3.3, Reclamation included the Second Basis of Comparison to identify changes that would occur due to actions that would not have been implemented without Reclamation's provisional acceptance of the BOs, as required by the District Court order. However, the Second Basis of Comparison is not consistent with the definition of the No Action Alternative used to develop the No Action Alternative for this EIS. Therefore, mitigation measures have not been considered for changes of alternatives as compared to the Second Basis of Comparison.

The analysis in the EIS includes hydrologic conditions projected to occur in 2030 with existing regulatory requirements, future population growth in areas located north of the Delta, climate change, and sea level rise, as described in Appendix 5A, Section A, CalSim II and DSM2 Modeling. These changes are not caused by changes in CVP and SWP operations, and would occur with or without implementation of the BOs or other actions in the alternatives. Because these changes are included in the No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5, the effects of these changes are not considered in the comparative analysis used in this EIS to determine effects of the alternatives.

Folsom Roseville SJWD 8: Comment noted.

Folsom Roseville SJWD 9: The CVP and SWP operations prioritize meeting federal and state regulatory requirements and deliveries to senior water rights holders, including the City of Sacramento. The modeling analyses presented in

the EIS include these prioritizations for long-term operation of the CVP and SWP without inclusion of changes that could be developed for specific extreme flood or drought events.

Reclamation is aware of the storage and diversion limitations that exist for the intakes in Folsom Lake during drought periods when Reclamation may be allocating and delivering water in consideration of federal and state regulatory requirements, including water rights. Droughts have occurred throughout California's history, and are constantly shaping and innovating the ways in which Reclamation and DWR balance both federal and state regulations, public health standards and urban and agricultural water demands. The most notable droughts in recent history are the droughts that occurred in 1976-77, 1987-92, and the ongoing drought. More details have been included in Section 5.3.3 of Chapter 5, Surface Water Resources and Water Supplies, in the Final EIS to describe historical responses by CVP and SWP to these drought conditions, including implementation of a barge and pump system in Folsom Lake to allow diversions when low water surface elevations would cause capacity issues for existing intakes.

Folsom Roseville SJWD 10: On October 9, 2015, the District Court granted a very short time extension to address comments received during the public review period, and requires Reclamation to issue a Record of Decision on or before January 12, 2016. This current court ordered schedule does not provide sufficient time for Reclamation to include additional alternatives, which would require recirculation of an additional Draft EIS for public review and comment, nor does Reclamation believe additional analysis is required to constitute a sufficient EIS. Reclamation is committed to continue working toward improvements to the USFWS and NMFS RPA actions through either the adaptive management process, Collaborative Science and Adaptive Management Program (CSAMP) with the Collaborative Adaptive Management Team (CAMT), or other similar ongoing or future efforts.

Folsom Roseville SJWD 11: The alternatives considered in the EIS were analyzed over a wide range of hydrologic conditions, including drought conditions in 1927 through 1934 and 1987 through 1992. The CalSim II model assumptions include assumptions for compliance with federal and state regulatory requirements. The model results indicate that CVP and SWP water deliveries under critical dry periods is minimal. For example, water deliveries to CVP and SWP water contractors (not water rights holders, settlement, or exchange contractors) would average about 22 to 30 percent of full contract amounts under critical dry year water conditions as shown in Tables C-19 and C-20 in Appendix 5A, Section C, CalSim II and DSM2 Model Results (see Table 5A.B.1 in Appendix 5A, Section B, CalSim II and DSM2 Modeling Simulations and Assumptions, for full contract amounts). The CalSim II model does not represent historical annual responses to extreme conditions by Reclamation, DWR, and other agencies to manage adverse conditions associated with wide range of water users, as described in Section 5.3 of Chapter 5, Surface Water Resources and Water Supplies, in the Final EIS.

1 **Folsom Roseville SJWD 12:** The No Action Alternative, Second Basis of
 2 Comparison, and Alternatives 1 through 5 all include hydrologic and water
 3 quality conditions with climate change and sea level rise at Year 2030. Because
 4 the EIS analysis is based upon a comparison of Alternatives 1 through 5 to the No
 5 Action Alternative, and a comparison of the No Action Alternative and
 6 Alternatives 1 through 5 to the Second Basis of Comparison, the effects of climate
 7 change and sea level rise are not included in the incremental differences between
 8 the alternatives. Therefore, the relative incremental differences between the
 9 alternatives at Year 2030 are representative of the differences between the
 10 alternatives with or without climate change and sea level rise.

11 **Folsom Roseville SJWD 13:** Section 7.4 of Chapter 7, Groundwater Resources
 12 and Groundwater Quality, has been modified in the Final EIS to provide more
 13 clarity related to localized groundwater issues in areas of the Central Valley in the
 14 vicinity of communities that use CVP and SWP water and that are not specifically
 15 addressed in the CVHM groundwater model. Information presented in Appendix
 16 5A, Section C, CalSim II and DSM2 Model Results, (e.g., projected CVP water
 17 deliveries) and Appendix 5D, Municipal and Industrial Water Demands and
 18 Supplies, (e.g., urban water management plan projections for 2030) were used in
 19 the EIS to analyze effects of the alternatives as compared to the No Action
 20 Alternative and Second Basis of Comparison.

21 **Folsom Roseville SJWD 14:** The EIS describes that a suite of alternative water
 22 supplies could be used by the Year 2030 during drier years and over the long-
 23 term. The alternative water supplies include wastewater and stormwater recycling
 24 and water conservation, as well as water transfers from water rights holders as is
 25 projected for the American River Basin in the urban water management plans for
 26 the Year 2030.

27 **Folsom Roseville SJWD 15:** As described in the response to Comment Folsom
 28 Roseville SJWD 9, Reclamation is aware of the storage and diversion limitations
 29 that exist for the intakes in Folsom Lake during drought periods when
 30 Reclamation may be allocating and delivering water in consideration of federal
 31 and state regulatory requirements, including water rights. Droughts have occurred
 32 throughout California's history, and are constantly shaping and innovating the
 33 ways in which Reclamation and DWR balance both federal and state regulations,
 34 public health standards and urban and agricultural water demands. The most
 35 notable droughts in recent history are the droughts that occurred in 1976-77,
 36 1987-92, and the ongoing drought. More details have been included in
 37 Section 5.3.3 of Chapter 5, Surface Water Resources and Water Supplies, in the
 38 Final EIS to describe historical responses by CVP and SWP to these drought
 39 conditions, including implementation of a barge and pump system in Folsom Lake
 40 to allow diversions when low water surface elevations would cause capacity
 41 issues for existing intakes.

42 **Folsom Roseville SJWD 16:** Please see response to Comments Folsom Roseville
 43 SJWD 2, Folsom Roseville SJWD 7, and Folsom Roseville SJWD 9.

Folsom Roseville SJWD 17: Comment noted. This comment is consistent with information presented in the EIS.

Folsom Roseville SJWD 18: As stated in Section 5A.A.5.4 of Appendix 5A, Section A, CalSim II and DSM2 Modeling, the median climate change scenario was based on more than hundred climate change projections and used for characterizing the future climate condition for the purposes of the EIS. Although projected changes in future climate contain significant uncertainty through time, several studies have shown that use of the median climate change condition is acceptable (e.g., Pierce et al. 2009). The median climate change is considered appropriate for the EIS because of the comparative nature of the NEPA analysis. Due to the use of the same climate change assumptions in the No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5, the results of the NEPA comparative analysis are indicative of the changes between the model runs without climate change at the Year 2030. The results of the CalSim II model run cannot be used in a predictive manner. Therefore, it was determined that a sensitivity analysis using the different climate change conditions was not required for this EIS.

Folsom Roseville SJWD 19: As stated in Appendix 5A, Section A, CalSim II and DSM2 Modeling, the hydrologic assumptions in all of the Sacramento Valley watersheds, including the American River watershed, were developed using historical hydrology and applying the climate change projections for each watershed to develop projected conditions in the Year 2030. However, the commenter is correct that the CalSim II model assumptions do not include any transient trends in the vegetation or water management that may affect stream flows that could be considered to be speculative under the NEPA No Action Alternative assumptions (see Section 5A.A.4 in Appendix 5A, Section A, of the EIS).

Folsom Roseville SJWD 20: Evaluation of water supplies over the 82-year simulation period of the CalSim II model includes several series of increased and decreased stressed conditions that range from extreme floods to extreme droughts. As described in Section 5A.A.3.5 of Appendix 5A, Section A, the CalSim II results may differ from real-time operations under stressed water supply conditions. Such model results occur due to the inability of the model to make real-time policy decisions under extreme circumstances. For example, reductions to senior water rights holders due to dead-pool conditions in the model can be observed in model results under certain circumstances as the CalSim II model makes month-by-month decisions based on values for that month only. These reductions would be lessened in real-time by making decisions in prior months as well as the current month to manage the actual available water supplies within legal and contractual obligations.

All of the CalSim II model runs in this EIS alternatives include consistent climate change conditions without consideration of potential regulatory or operational changes due to climate conditions in the future. Potential climate-related operational changes are currently unknown and it would be speculative to develop such assumptions for a NEPA analysis. Similarly, due to unique nature of each

flood or drought period, assuming a prescriptive “operation” would be considered speculative. The EIS acknowledges these uncertain conditions that cannot be quantitatively analyzed at this point; and attempts to qualitatively assess the effects of changes from current affected environment to conditions in 2030 in Section 5.4 of Chapter 5, Surface Water Resources and Water Supplies of the Final EIS.

The impact analysis compares conditions under the Alternatives 1 through 5 to the No Action Alternative; and under the No Action Alternative and Alternatives 1 through 5 to the Second Basis of Comparison. This comparative approach eliminates effects of future uncertainty that cannot be modeled because the uncertainty would occur under all compared alternatives. This comparative approach reduces the effects of climate change from the incremental changes which are used to compare the alternatives, No Action Alternative, and Second Basis of Comparison.

As described in response to Comment Folsom Roseville SJWD 9, Reclamation is aware of the storage and diversion limitations that exist for the intakes in Folsom Lake during drought periods when Reclamation may be allocating and delivering water in consideration of federal and state regulatory requirements, including water rights. Droughts have occurred throughout California’s history, and are constantly shaping and innovating the ways in which Reclamation and DWR balance both federal and state regulations, public health standards and urban and agricultural water demands. The most notable droughts in recent history are the droughts that occurred in 1976-77, 1987-92, and the ongoing drought. More details have been included in Section 5.3.3 of Chapter 5, Surface Water Resources and Water Supplies, in the Final EIS to describe historical responses by CVP and SWP to these drought conditions, including implementation of a barge and pump system in Folsom Lake to allow diversions when low water surface elevations would cause capacity issues for existing intakes.

Folsom Roseville SJWD 21: Comment noted.

Folsom Roseville SJWD 22: This comment is consistent with the information presented in the EIS.

Folsom Roseville SJWD 23: Please see response to Comment Folsom Roseville SJWD 20.

Folsom Roseville SJWD 24: As described in Appendix 5D, Municipal and Industrial Water Demands and Supplies, it is assumed that Sacramento Suburban Water District supplies are met through water purchased from Placer County Water Agency water rights water and treated by San Juan Water District, and water purchased from City of Sacramento water rights water.

Folsom Roseville SJWD 25: The comment is correct that the depletion terms in CalSim II model for El Dorado Irrigation District and El Dorado County Water Agency deliveries are not well-represented. A subsequent CalSim II model study was developed using a different configuration that would represent a worst-case scenario in terms of water supply in Folsom Lake. Based on this study, the

1 changes in overall system operations show similar conditions to the analysis
 2 presented in Appendix 5B, Sensitivity Analysis on Representation of EID's
 3 Warren Act and EDCWA's Water Service Contracts with Reclamation in
 4 Alternatives 3 and 5.

5 **1C.1.8 Friant Water Authority**



September 29, 2015

Eric Borba
Chairman of the Board

Kent H. Stephens
Vice Chairman

Lucille Demetriff
Secretary/Treasurer

Bill Luce
Interim General Manager

Jennifer T. Buckman
General Counsel

Member Agencies

*Arvin-Edison W.S.D.
 Chowchilla W.D.
 City of Fresno
 Kaweah Delta W.C.D.
 Kern-Tulare W.D.
 Lindmore I.D.
 Lindsay-Strathmore I.D.
 Orange Cove I.D.
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VIA ELECTRONIC MAIL

Mr. Ben Nelson, Natural Resources Specialist
 Bureau of Reclamation, Bay-Delta Office
 801 I Street, Suite 140
 Sacramento CA 95814-2536
bcnelson@usbr.gov

Re: Draft Environmental Impact Statement Regarding Coordinated Long-term
 Operation of the Central Valley Project and State Water Project

Dear Mr. Nelson,

The Friant Water Authority is a joint powers authority consisting of fourteen agencies that comprise 54% of the total Friant Division and Cross Valley Contract water supplies in the Friant Service Area. We have reviewed the draft EIS regarding the Coordinated Long-term Operation of the Central Valley Project (CVP and State Water Project (SWP) and have the following comments for your consideration.

FWA 1

First, we are totally confused by the characterization of the implantation of the 2008 USFWS delta smelt biological opinion and the 2009 NMFS winter run salmon biological opinion as the "No Action" alternative. While we appreciate the inclusion of the Second Basis of Comparison, which represents the true "No Action", it is bizarre on its face to declare that the "No Action" alternative include the actions that are the subject of the environmental review. This appears to be a deliberate attempt to mislead the public as to the true impacts of the biological opinions and to mischaracterize the significant impacts on CVP contractor's water supplies. The Final EIS should correct this "Alice in Wonderland" logic and describe the Second Basis of Comparison as the No Action alternative.

FWA 2

Second, we were disappointed to note that Reclamation did not even include the Friant Division facilities as part of the CVP facilities that are potentially impacted by the subject biological opinions, even though the Friant Water Authority is identified in Chapter 1, page 1-13 as an entity with which Reclamation had or was in the process of signing an MOU. Clearly, the Friant Contractors rely on the operations of the CVP and Delta exports to ensure delivery of water from the San Joaquin River.

FWA 3

6

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September 29, 2015
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Third, Table 5.26. Changes in CVP Water Deliveries under the No Action Alternative as Compared to the Second Basis of Comparison, reflects no changes to deliveries to Exchange Contractors in any year. While we understand the limitations of modeling for comparison of long term operations, Reclamation is well aware that in both 2014 and 2015 there were insufficient exports of CVP water to meet the Substitute Water delivery requirements to the Exchange Contractors, which we are informed and believe to be largely the result of the implementation of the two subject biological opinions and their RPAs. As a result of these reduced exports, all of the San Joaquin River runoff in 2014 and a substantial portion of the San Joaquin River runoff in 2015 was delivered to the Exchange Contractors, which left Friant Long Term Contractors with a zero allocation in both years.

FWA 4

This circumstance resulted in significant impacts to farms and communities in the Friant service area, including, but not limited to the following: Water users within the Friant Division were forced to rely on groundwater alone for their entire 2014 supply. The results were predictably disastrous. Thousands of acres of productive fruit and nut trees had to be abandoned due to lack of any or sufficient water supply. The total economic loss associated with the loss of nearly 30,000 acres of trees, including lost production until crops could be replanted and begin production again, was over \$1 billion. Hundreds of domestic wells went dry. 15 communities in California ran out of drinking water supplies in 2014: 14 of those communities -- Alpaugh, Earlimart, Farmersville, Frazier Park, Huron, Lindsay, London, Madera County, Orange Cove, Pixley, Poplar, Porterville, Strathmore, Tipton, and Terra Bella -- are within the Friant Service Area. Some of these communities depend exclusively on Friant Division supplies to sustain them, while others rely on groundwater sources that are normally boosted by the surface water deliveries; last year, those sources were overtaxed and failed. Homes within these areas remain without adequate water for drinking, basic sanitation, and fire suppression. To this day, numerous families who have lost their domestic wells at their homes have to drive to a public park to shower. Some of these families have been without water in their homes for 7 – 9 months. The impact has been disproportionately large on low-income families that cannot afford to move or dig deeper wells. Impacts for 2015 have not been fully determined, but they are likely to be similar, if not greater.

This magnitude of economic damage from the implementation of the biological opinions cannot be ignored simply because the long-term CalSIM II modeling couldn't discern what was known to have happened in 2014 and 2015. The water supply analysis should be corrected to address the very real likelihood of reductions in Delta supplies to the Exchange Contractors caused by the subject biological opinions' Project modifications, which result in Friant Division water supply reductions, and the concomitant impacts of these supply reductions should be discussed in the Final EIS's resource chapters.

Mr. Ben Nelson
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If you have any questions regarding these comments, please feel free to contact me at sottemoeller@friantwater.org or (559) 306-9986.

Sincerely,



Stephen H. Ottemoeller
Acting Interim General Manager
Friant Water Authority

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2 **1C.1.8.1 Responses to Comments from Friant Water Authority**

3 **FWA 1:** Comment noted.

4 **FWA 2:** As described in Section 3.3, Reclamation had provisionally accepted the
5 provisions of the 2008 USFWS BO and 2009 NMFS BO, and was implementing
6 the BOs at the time of publication of the Notice of Intent in March 2012. Under
7 the definition of the No Action Alternative in the National Environmental Policy
8 Act regulations (43 CFR 46.30), Reclamation's NEPA Handbook (Section 8.6),
9 and Question 3 of the Council of Environmental Quality's Forty Most Asked
10 Questions, the No Action Alternative could represent a future condition with "no
11 change" from current management direction or level of management intensity, or
12 a future "no action" conditions without implementation of the actions being
13 evaluated in the EIS. The No Action Alternative in this EIS is consistent with the
14 definition of "no change" from current management direction or level of
15 management. Therefore, the RPAs were included in the No Action Alternative as
16 Reclamation had been implementing the BOs and RPA actions, except where
17 enjoined, as part of CVP operations for approximately three years at the time the
18 Notice of Intent was issued (2008 USFWS BO implemented for three years and
19 three months, 2009 NMFS BO implemented for two years and nine months).

20 As described in Section 3.3, Reclamation included the Second Basis of
21 Comparison to identify changes that would occur due to actions that would not
22 have been implemented without Reclamation's provisional acceptance of the
23 BOs, as required by the District Court order. However, the Second Basis of
24 Comparison is not consistent with the definition of the No Action Alternative
25 used to develop the No Action Alternative for this EIS. Therefore, mitigation
26 measures have not been considered for changes of alternatives as compared to the
27 Second Basis of Comparison.

1 **FWA 3:** Reclamation was directed by the District Court to remedy its failure to
2 conduct a NEPA analysis when it accepted and implemented the 2008 USFWS
3 BO RPA and the 2009 NMFS BO RPA pursuant to the Federal Endangered
4 Species Act of 1973 (ESA) as amended (United States Code [U.S.C.] 1531 ET
5 SEQ.). The BOs did not address the Friant Division of the CVP; therefore, the
6 EIS does not address the Friant Division of the CVP.

7 **FWA 4:** The EIS analysis assumes all water deliveries to the San Joaquin River
8 Exchange Contractors are conveyed through the Delta; and water deliveries from
9 Millerton Lake would be similar under all alternatives and the Second Basis of
10 Comparison in all water year types. However, it is recognized that during
11 extreme droughts, water can be delivered to the San Joaquin River Exchange
12 Contractors from Millerton Lake and CVP deliveries to users along the Friant and
13 Madera canals can be reduced. Droughts have occurred throughout California's
14 history, and are constantly shaping and innovating the ways in which Reclamation
15 and DWR balance both public health standards and urban and agricultural water
16 demands while protecting the Delta ecosystem and its inhabitants. The most
17 notable droughts in recent history are the droughts that occurred in 1976-77,
18 1987-92, and the ongoing drought. More details have been included in Section
19 5.3.3 of Chapter 5, Surface Water Resources and Water Supplies, in the Final EIS
20 to describe historical responses by CVP and SWP to these drought conditions,
21 including recent deliveries of CVP water to the San Joaquin River Exchange
22 Contractors.

1 **1C.1.9 Northern California Water Association and Glenn-Colusa**
 2 **Irrigation District**



NCWA
Northern California Water Association



September 28, 2015

Via First-Class Mail And Electronic Mail

Mr. Ben Nelson
Bureau of Reclamation
801 I Street, Suite 140
Sacramento, CA 95814-2536
bcnelson@usbr.gov

Re: Northern California Water Association and Glenn-Colusa Irrigation District Comments on Draft Environmental Impact Statement for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project

Dear Mr. Nelson:

The Northern California Water Association (NCWA) and Glenn-Colusa Irrigation District (GCID) provide these comments on the Bureau of Reclamation's Draft Environmental Impact Statement for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project ("DEIS"). As discussed below, and as detailed in other comments submitted to Reclamation on this matter, the DEIS should be revised and additional analysis should be conducted before Reclamation adopts a Final Environmental Impact Statement ("FEIS") for the proposed actions.

NCWA
GCID
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Deficient Alternatives Analysis

Under the National Environmental Policy Act ("NEPA"), each federal agency must prepare a detailed environmental impact statement ("EIS") for any "major Federal action[] significantly affecting the quality of the human environment." (42 U.S.C. § 4332, subd. (2)(c).) The EIS must include "the alternative of no action." (40 C.F.R. § 1502.14(d); *American Rivers v. FERC* (9th Cir. 1999) 187 F.3d 1007, 1020.) The no action alternative represents the "status quo," defined as the continuation of existing policy and management direction without adoption of the proposed major Federal action. (*American Rivers, supra*, 187 F.3d at pp. 1020-1021.) A valid EIS must also evaluate the proposed action and all reasonable alternatives, and include appropriate mitigation measures not already included in the proposed action or alternatives. (40 C.F.R. § 1502.14, subds. (a)-(c), (f).)

NCWA
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Pursuant to the Ninth Circuit's decision in *San Luis & Delta-Mendota Water Authority v. Jewell*, 747 F.3d 581 (9th Cir. 2014), Reclamation is required to prepare an EIS that discloses the effects of adopting the Reasonable and Prudent Alternatives ("RPA") contained in the United States Fish and Wildlife Service's 2008 delta smelt biological opinion ("2008 USFWS BiOp"). In this regard, the Court stated as follows:

At this point, we can only speculate about what kind of significant effects will eventually result from implementation of the BiOp because Reclamation has not yet completed its EIS. But it is beyond dispute that Reclamation's implementation of the BiOp has important effects on human interaction with the natural environment. We know that

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millions of people and vast areas of some of America's most productive farmland will be impacted by Reclamation's actions. Those impacts were not the focus of the BiOp. In sum, we cannot reach an informed decision about the extent to which implementation of the BiOp is an environmental preservation action in the vein of *Douglas County* and *Drakes Bay Oyster* because we do not know how the action will impact the broader natural environment. We find no basis for exempting Reclamation from the EIS requirement. [Citation.] We recognize that the preparation of an EIS will not alter Reclamation's obligations under the ESA. *But the EIS may well inform Reclamation of the overall costs – including the human costs – of furthering the ESA.*

Id., 747 F.3d at 653 (italics added).)

In accordance with the court orders, Reclamation prepared the DEIS. (DEIS, p. 1-9.) The DEIS states that its purpose is to "conduct a NEPA review to determine *whether the RPA actions cause a significant impact on the human environment.*" (DEIS, p. 2-2 (italics added).) In the DEIS, however, Reclamation defined the baseline, "No Action Alternative" conditions to include the RPA actions described in the 2008 USFWS BiOp RPA and the 2009 National Marine Fisheries Service ("NMFS") salmonid biological opinion ("2009 NMFS BiOp") in 2030. (DEIS, pp. 3-21 to 3-22.) The DEIS states Reclamation did this because Reclamation provisionally accepted and implemented the RPAs in the 2008 USFWS BiOp and 2009 NMFS BiOp prior to preparation of the DEIS. (DEIS, p. 3-22.) The DEIS also includes a Second Basis of Comparison that does not include implementation of the RPAs. (*Ibid.*)

By defining the No Action Alternative to include the major federal action that the courts ordered Reclamation to analyze, Reclamation has not complied with NEPA or the applicable court directives. The purpose of requiring Reclamation to prepare an EIS was to inform Reclamation of the human and environmental costs of significantly changing the status quo for the state and federal water projects by adopting the RPAs. (*San Luis & Delta-Mendota Water Authority, supra*, 747 F.3d at 653.) The DEIS does not meet this requirement because it *assumes* the RPAs are part of the status quo by defining the No Action Alternative to include them. This results in a flawed alternatives analysis because it assumes that the status quo includes incurring the significant human and environmental costs of implementing the RPAs, and then the DEIS proceeds to analyze the five alternatives against this assumption. This contravenes the analysis required by NEPA and ordered by the Ninth Circuit.

The DEIS attempts to address this issue by including a "Second Basis of Comparison," which "represents a condition in 2030 without implementation of the 2008 USFWS BO and 2009 NMFS BO," and then by also comparing the other alternatives to this basis of comparison. (DEIS, p. 3-3.) This analytical approach, however, does not comport with the Ninth Circuit's decision, because the DEIS does not describe the incremental changes from the Second Basis of Comparison to the alternatives as impacts of the proposed actions, and does not consider whether mitigation measures are needed to address the impacts of the alternatives when compared to the Second Basis of Comparison. Instead, the inclusion of the RPAs in the No Action Alternative leads the DEIS to improperly conclude that no mitigation is necessary for the adoption of the RPAs. If the DEIS had properly included adoption of the RPAs as an alternative, rather than as part of the No Action Alternative, then the DEIS would have been required to include appropriate mitigation measures to address the effects of the implementing the RPAs. (40 C.F.R. § 1502.14, subd. (f).) Instead, the DEIS assumes implementation of the RPAs, and fails to include appropriate mitigation measures to address their effects. (See, e.g., DEIS, pp. 5-237 to 5-261 (failing to include mitigation for effects on surface water of implementing the RPAs).)

Deficient Hydrological Analysis

The DEIS's hydrological analysis does not accurately analyze how the CVP and SWP would be operated with the combined effects of climate change and multi-year droughts, and, as a result, does not properly

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Ben Nelson
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analyze the impacts of the proposed actions. The DEIS acknowledges that its analysis and conclusions are probably inaccurate during extremely dry conditions that come with multi-year droughts:

Under extreme hydrologic and operational conditions where there is not enough water supply to meet all requirements, CalSim II utilizes a series of operating rules to reach a solution to allow for the continuation of the simulation. It is recognized that these operating rules are a simplified version of the very complex decision processes that CVP and SWP operators would use in actual extreme conditions. Therefore, *model results and potential changes under these extreme conditions should be evaluated on a comparative basis between alternatives and are an approximation of extreme operational conditions.* As an example, CalSim II model results show simulated occurrences of extremely low storage conditions at CVP and SWP reservoirs during critical drought periods when storage is at dead pool levels at or below the elevation of the lowest level outlet. Simulated occurrences of reservoir storage conditions at dead pool levels may occur coincidentally with simulated impacts that are determined to be potentially significant. When reservoir storage is at dead pool levels, there may be instances in which flow conditions fall short of minimum flow criteria, salinity conditions may exceed salinity standards, diversion conditions fall short of allocated diversion amounts, and operating agreements are not met.

(DEIS, p. 5-61 (italics added).)

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continued

Regarding climate change, the DEIS does not disclose the proposed alternatives' impacts against baseline conditions without projected climate change. Instead, all of the DEIS's alternatives include the projected future impacts of climate change in the 2030 timeframe. (DEIS, p. ES-7.) This makes it impossible for the reviewing public to segregate impacts that are predicted to result from climate change from the impacts that would occur due to implementation of the proposed alternatives. Furthermore, it is not possible to know whether future climate change will occur exactly as projected in the DEIS's single climate change scenario. In this regard, the DEIS does not adequately inform the public of the proposed alternatives' impacts, because the lack of an analysis of the proposed alternatives' impacts without climate change obscures how the state and federal projects are likely to operate if climate change does not occur exactly as projected in the DEIS.

NCWA
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Conclusion

For the foregoing reasons, the DEIS should be revised and additional analyses should be conducted before Reclamation adopts an FEIS for the proposed actions. NCWA and GCID appreciate Reclamation's consideration of these comments.

NCWA
GCID
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Sincerely,



David J. Guy
President
Northern California Water Association



Thaddeus Bettner
General Manager
Glenn-Colusa Irrigation District

cc: Andrew Hitchings

1C.1.9.1 Responses to Comments from Northern California Water Association and Glenn-Colusa Irrigation District

NCWA GCID 1: Comment noted.

NCWA GCID 2: As described in Section 3.3, Reclamation had provisionally accepted the provisions of the 2008 USFWS BO and 2009 NMFS BO, and was implementing the BOs at the time of publication of the Notice of Intent in March 2012. Under the definition of the No Action Alternative in the National Environmental Policy Act regulations (43 CFR 46.30), Reclamation's NEPA Handbook (Section 8.6), and Question 3 of the Council of Environmental Quality's Forty Most Asked Questions, the No Action Alternative could represent a future condition with "no change" from current management direction or level of management intensity, or a future "no action" conditions without implementation of the actions being evaluated in the EIS. The No Action Alternative in this EIS is consistent with the definition of "no change" from current management direction or level of management. Therefore, the RPAs were included in the No Action Alternative as Reclamation had been implementing the BOs and RPA actions, except where enjoined, as part of CVP operations for approximately three years at the time the Notice of Intent was issued (2008 USFWS BO implemented for three years and three months, 2009 NMFS BO implemented for two years and nine months).

As described in Section 3.3, Reclamation included the Second Basis of Comparison to identify changes that would occur due to actions that would not have been implemented without Reclamation's provisional acceptance of the BOs, as required by the District Court order. However, the Second Basis of Comparison is not consistent with the definition of the No Action Alternative used to develop the No Action Alternative for this EIS. Therefore, mitigation measures have not been considered for changes of alternatives as compared to the Second Basis of Comparison.

The analysis in the EIS includes hydrologic conditions projected to occur in 2030 with existing regulatory requirements, future population growth in areas located north of the Delta, climate change, and sea level rise, as described in Appendix 5A, Section A, CalSim II and DSM2 Modeling. These changes are not caused by changes in CVP and SWP operations, and would occur with or without implementation of the BOs or other actions in the alternatives. Because these changes are included in the No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5, the effects of these changes are not considered in the comparative analysis used in this EIS to determine effects of the alternatives.

NCWA GCID 3: The alternatives considered in the EIS were analyzed over a wide range of hydrologic conditions, including drought conditions in 1927 through 1934 and 1987 through 1992. The CalSim II model assumptions include assumptions for compliance with federal and state regulatory requirements. The model results indicate that CVP and SWP water deliveries under critical dry periods is minimal. For example, water deliveries to CVP and SWP water contractors (not water rights holders, settlement, or exchange contractors) would average about 22 to 30 percent of full contract amounts under critical dry year

1 water conditions as shown in Tables C-19 and C-20 in Appendix 5A, Section C,
 2 CalSim II and DSM2 Model Results (see Table 5A.B.1 in Appendix 5A, Section
 3 B, CalSim II and DSM2 Modeling Simulations and Assumptions, for full contract
 4 amounts). The CalSim II model does not represent historical annual responses to
 5 extreme conditions by Reclamation, DWR, and other agencies to manage adverse
 6 conditions associated with wide range of water users, as described in Section 5.3
 7 of Chapter 5, Surface Water Resources and Water Supplies, in the Final EIS.
 8 Additional details have been included in Section 5.3 to describe recent CVP
 9 operations that delivered water to the San Joaquin River Exchange Contractors
 10 from Millerton Lake.

11 **NCWA GCID 4:** The No Action Alternative, Second Basis of Comparison, and
 12 Alternatives 1 through 5 all include hydrologic and water quality conditions with
 13 climate change and sea level rise at Year 2030. Because the EIS analysis is based
 14 upon a comparison of Alternatives 1 through 5 to the No Action Alternative, and
 15 a comparison of the No Action Alternative and Alternatives 1 through 5 to the
 16 Second Basis of Comparison, the effects of climate change and sea level rise are
 17 not included in the incremental differences between the alternatives. Therefore,
 18 the relative incremental differences between the alternatives at Year 2030 are
 19 representative of the differences between the alternatives with or without climate
 20 change and sea level rise.

21 **NCWA GCID 5:** Comment noted.

22 On October 9, 2015, the District Court granted a very short time extension to
 23 address comments received during the public review period, and requires
 24 Reclamation to issue a Record of Decision on or before January 12, 2016. This
 25 current court ordered schedule does not provide sufficient time for Reclamation to
 26 include additional alternatives, which would require recirculation of an additional
 27 Draft EIS for public review and comment, nor does Reclamation believe
 28 additional analysis is required to constitute a sufficient EIS. Reclamation is
 29 committed to continue working toward improvements to the USFWS and NMFS
 30 RPA actions through either the adaptive management process, Collaborative
 31 Science and Adaptive Management Program (CSAMP) with the Collaborative
 32 Adaptive Management Team (CAMT), or other similar ongoing or future efforts.

1 **1C.1.10 Oakdale Irrigation District, South San Joaquin Irrigation**
2 **District, and Stockton East Water District**



September 29, 2015

VIA ELECTRONIC MAIL

Mr. Ben Nelson
Bureau of Reclamation
Bay-Delta Office
801 I Street, Suite 140
Sacramento, CA 95814-2536
Email: bcnelson@usbr.gov

RE: Comments from Stanislaus River Plaintiffs on Draft EIS for the Coordinated
Long-Term Operation of the CVP and SWP

Dear Mr. Nelson:

The Stanislaus River Plaintiffs, comprised of Oakdale Irrigation District (OID), South San Joaquin Irrigation District (SSJID), and Stockton East Water District (SEWD), submit the following comments on the Draft Environmental Impact Statement (DEIS) for the Coordinated Long-Term Operation of the CVP and SWP.

OID
SSJID
SEWD 1

Chapter 1

The DEIS states that the "CVP provides water stored in New Melones Reservoir for water rights holders in the Stanislaus River watershed and CVP contractors in the northern San Joaquin Valley and to meet existing water right permit conditions to support fish and wildlife and water quality beneficial uses." (p. 1-10, ln. 35-38.) This statement is incomplete. The CVP provides water to OID and SSJID pursuant to an Agreement and Stipulation with the Bureau of Reclamation from 1988. The CVP provides project water to SEWD and Central San Joaquin Water Conservation District (CSJWCD) pursuant to contract.

OID
SSJID
SEWD 2

At page 1-11, the DEIS fails to recognize and address Phases 1-3 of the State Water Resources Control Board's (SWB) Water Quality Control Plan (WQCP). The SWB initiated the process in 2009. The Draft WQCP and Substitute Environmental Document were issued in 2012. The Draft 2012 had as a preferred alternative 35% unimpaired flow from February 1 through June 30. None of the alternatives include such a flow regime for the New Melones Project, which

OID
SSJID
SEWD 3

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is covered by Phase I. The material for Phase I can be found at www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/bay_delta_plan/water_quality_control_planning/index.shtml

OID
SSJID
SEWD 3
continued

At **subchapter 1.7** (Participants in Preparation), the DEIS fails to note that SSJID has signed the Memorandum of Understanding (MOU).

OID
SSJID
SEWD 4

At **subchapter 1.8** (Related Projects and Activities), the DEIS fails to list the SWB's WQCP for the San Joaquin-Sacramento Rivers and Bay-Delta.

OID
SSJID
SEWD 5

Chapter 3: Description of Alternatives

As an initial matter, the alternatives are purposely confusing and complicated. It is impossible to determine from the alternatives what is being studied. Given the scope of the study and volumes of water involved, including and then excluding certain actions or projects just gets lost in the noise.

OID
SSJID
SEWD 6

It appears that the intention of the authors was to set up alternatives without distinction.

Chapter 5: Surface Water Resources and Water Supplies

At **subchapter 5.3.2.2.2**, describing Hydrological Conditions and Major Surface Water Facilities in the San Joaquin Valley, the DEIS uses old and outdated data to describe the Stanislaus River. (p. 5-36, Ins. 10-16.) The DEIS uses averages and medians over a 90-year period. The average runoff in the Stanislaus River Basin over the past 20 years has dropped. It is expected with climate change that while the amount of precipitation may remain the same, the runoff will be due more to rainfall and less to snowmelt. With changing thermoclines, this will impact water temperatures in reservoirs.

OID
SSJID
SEWD 7

There is also no discussion of the firm yield of the project. Prior Reclamation studies found the firm yield of the project to be less than 700,000 acre-feet, based on the 1987-1992 drought. The current drought of 2011 – present is more severe, so the firm yield should also be less.

OID
SSJID
SEWD 8

At **page 5-36, lines 29-30**, please provide a citation for the assertion that “[t]wenty ungauged tributaries contribute intermittent flows to the lower portion of the Stanislaus River.” This number appears exceedingly high and misleading.

OID
SSJID
SEWD 9

The entire description of New Melones Reservoir found on **pages 5-36 (Ins. 34-44)** and **5-37 (Ins. 1-17)** is incorrect and must be rewritten. The following facts should be stated in this subsection.

OID
SSJID
SEWD 10

Appendix 1C: Comments from Regional and Local Agencies and Responses

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Reclamation has an Agreement with OID and SSJID on how Reclamation will operate New Melones to meet the Districts' Senior Water Rights first. The Districts' water is not CVP project water. The Districts' water cannot be used to meet NMFS's Reasonable and Prudent Alternative Table 2E flows. Once the senior rights of the Districts' have been met, then Reclamation has water available to meet its obligations.

OID
SSJID
SEWD 10
continued

The paragraphs on meeting D-1641 objectives are vague and ambiguous. The Dissolved Oxygen Objective is contained in CVRWQCB Basin Plan, and made a condition of Reclamation's water right permit by D-1422. The description of "minimum flow requirements . . . at Vernalis" is vague (pg. 5-37, ln. 9.) There are three (3) specific requirements: February-June flows, April-May pulse flow, and October minimum flows.

OID
SSJID
SEWD 11

Reclamation has not met the April-May Pulse flow requirement since the end of VAMP. Are the model runs done with the April-May Pulse Flow being solely met by Reclamation from New Melones?

The February-June flow requirements have also not been met. Are the model runs done with the February-June Pulse Flow being solely met by Reclamation from New Melones?

Finally, in the last two (2) years, the October flow requirement has not been met. Are the model runs done with the October minimum flows being solely met by Reclamation from New Melones?

Reclamation's water rights for the entire CVP are currently, solely, responsible for meeting these flows.

At page 5-37, lines 12-17, delete Goodwin Reservoir material. It is a re-regulating reservoir holding less than 2,000 acre-feet. This type of information is totally irrelevant to the questions presented under Chapter 5.

OID
SSJID
SEWD 12

At page 5-52, lines 4-7, the 2009 OCAP-BO specifies that Reclamation meets the flow schedule, however the Vernalis April-May Pulse Flow has not been met since the end of VAMP.

OID
SSJID
SEWD 13

Regarding the CalSim II Model (p. 5-60, lines 18-21), CalSim II is a land use based model. OID and SSJID have been and will continue to use the full amount of their water rights. Pursuant to the 1988 Agreement, the Districts are entitled to 600,000 acre-feet. CalSim II uses projected land-use and arrives at an average annual use of 526,000 acre-feet. The unused portion (74,000 acre-feet) goes into storage in New Melones. This presents an extremely optimistic and distorted picture of reservoir storage in New Melones. The Districts' water use the last 15 years has been fully maximized.

OID
SSJID
SEWD 14

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At page 5-60, lines 27-29, the statement that “[w]ater rights deliveries to non-CVP and non-SWP water rights holders are not modified in the CalSim II simulations of the alternatives” is incorrect. They are modified. They are reduced.

OID
SSJID
SEWD 15

Regarding subsection 5.4.2.1, climate change and sea level rise can mask impacts. An alternative basis with no climate change or sea level rise should be included for analysis purposes.

OID
SSJID
SEWD 16

Regarding Table 5.20 (p. 5-84) showing Changes in New Melones Reservoir Storage under the No Action Alternative as Compared to the Second Basis of Comparison, the numbers being used are averages. Averages do not disclose impacts. Since Reclamation has this information, please provide maximums and minimums as well.

OID
SSJID
SEWD 17

Regarding Table 5.37 (p. 5-112), please provide maximums and minimum figures in addition to the averages.

OID
SSJID
SEWD 18

Regarding Table 5.54 (p. 5-140), please provide maximums and minimum figures in addition to the averages.

OID
SSJID
SEWD 19

Beginning at page 5-192, comparing Changes in New Melones Reservoir Storage and Elevation under Alternative 5 as Compared to the No Action Alternative, please address the following.

OID
SSJID
SEWD 20

The SWB and the Delta Watermaster have both notified Reclamation by letter that it is responsible for meeting the D-1641 April-May Pulse Flow. As such, this analysis should be included in the No Action, not as a separate alternative. (No Action as set forth by NEPA.) The analysis provided in this section is helpful, but the modeling done in the No Action should have included this analysis. Then the No Action would have had significant impacts to Reservoir storage in New Melones’ flows and water temperatures in the Stanislaus River. See Table 5.88.

Chapter 6: Surface Water Quality

6.3.3.2 Water Temperature

This section of the DEIS provides information regarding water temperatures in the San Joaquin River upstream of the confluence of the Stanislaus River. This information is irrelevant since Alternatives 1 through 5 would not influence conditions in this reach. Air temperatures control water temperatures in the San Joaquin River and South Delta. Releases from New Melones will not impact water temperatures in the San Joaquin River or South Delta downstream of the confluence of the Stanislaus River.

OID
SSJID
SEWD 21

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Table 6.16 presents temperature objectives recommended by the USEPA to be used as guidelines in determining temperature criteria. These guidelines represent optimal conditions determined by laboratory studies of salmonids from the Pacific Northwest. The temperature tolerances of Central Valley salmon stocks are likely distinct from those of other stocks in the Pacific Northwest, and the applicability of laboratory derived tolerance values to stocks that have evolved in (and are adapted to) habitats at the southernmost extent of the species' range is questionable. High growth and survival of natural Chinook stocks in the Central Valley at temperatures considered higher than optimal for most stocks (based on data from northern stocks) indicate high thermal tolerance of these stocks.

OID
SSJID
SEWD 21
continued

6.3.3.2.2 Stanislaus River Water Temperature

As was predicted by extensive modeling previously conducted, water temperature objectives established in NMFS 2009 BO have not been met. See Attachment A.

OID
SSJID
SEWD 22

Chapter 9: Fish and Aquatic Resources

At 9.3.4.16, the DEIS improperly references a body of water by the name of Goodwin Lake. There is no Goodwin Lake. There is a Goodwin Dam.

OID
SSJID
SEWD 23

9.3.4.17.1 Fall-run Chinook Salmon

The DEIS provides no quantitative descriptions of the temporal and geographic distribution of fall-run Chinook salmon spawning in the Stanislaus River. Based on redd surveys conducted by FISHBIO, peak spawning typically occurs in November with roughly 7% of spawning occurring prior to November 1, and 2% prior to October 15. The few redds created during late-September and early October are typically near the upper end of Goodwin Canyon. More information is provided in Attachment A for reference.

OID
SSJID
SEWD 24

There is no hatchery on the Stanislaus River, yet since the implementation of constant fractional marking, at least 22% of salmon observed at the Stanislaus River weir have been adipose fin-clipped indicating they were of hatchery origin. With approximately 25% of hatchery production marked, it is estimated that nearly all adult salmon escaping to the Stanislaus River are of hatchery origin. This finding is similar to the results of otolith microchemistry analyses which found that approximately 90% of Central Valley salmon were of hatchery origin (Barnett-Johnson 2007).

OID
SSJID
SEWD 25

9.3.4.17.1 Steelhead

The Stanislaus River is known to have one of the largest populations of *O. mykiss* in the Central Valley. FISHBIO estimated the yearly average abundance to be about 20,220 trout in the river between 2009-2014, and in that time numbers never dipped below 14,000 fish. This abundance is due in part to high quality habitat, particularly in Goodwin Canyon, where water is

OID
SSJID
SEWD 26

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fast moving and boulders create a diversity of hiding places for the fish. Highest densities and abundances of *O. mykiss* are consistently found in Goodwin Canyon. In 2015, abundance declined to only about 5,000 fish. Densities, or numbers of *O. mykiss* per river mile or per habitat unit, have been on the decline since 2013, with 2015 densities the lowest on record. The most dramatic decline has been observed between Goodwin Dam and Knights Ferry. It appears that temperature is the single most important factor driving abundance, and small year-to-year variations in flow have no substantial effect. Due to low storage in New Melones Reservoir, water temperatures have increased substantially in recent years. See Attachment A for more information.

OID
SSJID
SEWD 26
continued

Weir monitoring since 2003 indicates that on average, about 5 untagged adult *O. mykiss* >16" migrate upstream in the Stanislaus River annually. Most spawning is believed to occur upstream of Orange Blossom Bridge, not Oakdale.

9.3.4.17.2 Aquatic Habitat

First, Reclamation does not manage New Melones for cold-water supply or releases. In order to access cold water pools in the reservoir, the low-level outlet must be used. This outlet has only been opened twice in the history of the project.

OID
SSJID
SEWD 27

Contrary to Hallock et al. (1970) indicating adult migration is prevented under low dissolved oxygen (DO), migration has been observed at DO < 5mg/L. Adult upstream migration rate and timing is not dependent on DO concentrations. Low DO concentrations are limited to the Deep Water Ship Channel (DWSC), and are the result of anthropogenic manipulation of channel geometry. The Stanislaus River discharges high-quality Sierra Nevada water which has low planktonic algal content and oxygen demand, and is not a major source of oxygen demand contributing to the low DO problem in the DWSC. DO concentrations in the DWSC can be ameliorated by installation of the Head of Old River Barrier. See Attachments B, C and D for additional information regarding dissolved oxygen.

OID
SSJID
SEWD 28

9.3.4.17.4 Predation

Various studies have identified predation by non-native species as a significant source of mortality of juvenile Chinook salmon in the San Joaquin Basin. Reduced juvenile survival due to predation is a key factor limiting efforts to increase salmon survival and abundance.

OID
SSJID
SEWD 29

Between 1986 and 2006, paired releases of large groups of coded wire tagged smolts were made near the upper extent of spawning and near the mouth of the Stanislaus, Tuolumne, and Merced rivers. Tributary survival was estimated based on the numbers of tagged smolts from the upper group relative to the lower group that were recovered in the San Joaquin River at Mossdale. These mark-recapture studies provided the first direct estimates of poor tributary survival in some years.

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Rotary screw trapping to monitor juvenile outmigration from the Stanislaus River began in 1995, and comparisons of estimated abundance at an upstream site relative to a downstream site near the confluence with the San Joaquin River indicate survival is poor in many years. This data is valuable because it provides estimates of survival for naturally produced juvenile salmon of all lifestages migrating volitionally throughout the varying conditions observed during each migration season.

In 1998 and 1999, a pilot radio telemetry study conducted in the Stanislaus River was the first in the basin to directly confirm predation by electroshocking a large striped bass and retrieving the radio tag (the tagged salmon smolt was digested) from its stomach. This early research was important and established that predation was occurring, that suspected predation was occurring more frequently in substantially altered habitats such as mine pits and deep scour holes, and that non-native predators were present and relatively abundant in the Stanislaus River even under the wetter hydrology observed in the years studied.

The Stanislaus River counting weir, which has been in operation since 2003, was the first of its type used in the Central Valley. Weir monitoring has documented migration characteristics of adult striped bass, and has demonstrated that stripers live in the river year-round and are abundant, especially in dry years.

In 2012, after more than 15 years of juvenile outmigrant survival studies and monitoring indicating that predation is a major problem in the Stanislaus River, the USFWS estimated smolt survival using radio telemetry. The survival estimate of 7% in 2012 was much lower than the 40-60% previously estimated by CWT mark-recapture studies conducted by CDFW.

Differential in catches at upstream and downstream rotary screw traps in the Tuolumne River between 2007 and 2012 also indicate high losses ranging from 76% to 98%. In 2012 rotary screw trap monitoring on the Tuolumne River found 96% mortality of juvenile Chinook outmigrants. As part of relicensing for the Don Pedro Project, a predation study conducted the same year found that based on observed predation rates and estimated predator abundance between the RSTs, it is plausible that most losses of juvenile Chinook salmon in the lower Tuolumne River between the upper and lower traps during 2012 could be attributed to predation by non-native predatory species.

In addition to the evidence in the Stanislaus and Tuolumne rivers, the Vernalis Adaptive Management Plan (VAMP) investigated the relationship between salmon smolt survival through the San Joaquin Delta and flow, exports, and operation of the Head of Old River Barrier between 2000 and 2011. A peer review of this work and the results of similar, earlier studies, concluded that "high and likely highly variable impacts of predation, appear to affect survival rates more than the river flow". Since 2003, survival through the San Joaquin Delta has consistently been < 12%, while flows at Vernalis ranged between 2,000 cfs and 27,000 cfs.

OID
SSJID
SEWD 29
continued

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During spring 2014 a predation study in the lower San Joaquin River near Mossdale was conducted by NOAA Fisheries under contract to DWR. Predators were found to outnumber Chinook salmon by a ratio of roughly 200 predators for every 1 Chinook salmon. Similar to recent studies conducted by NOAA Fisheries on the Sacramento River, live Chinook salmon were tethered to quantify the frequency of predation events. On some nights, 100% of the tethered Chinook salmon were preyed upon within one hour, indicating much heavier predation rates in the San Joaquin River than observed during the studies conducted on the Sacramento River. Similar to previous work in the tributaries, this study provided the first direct estimates of predation in the San Joaquin River confirming that low survival rates could likely be explained by predation by introduced fish species such as largemouth bass and striped bass.

OID
SSJID
SEWD 29
continued

9.4 Impact Analysis

Table 9.3 showing Water Temperature Objectives utilize average monthly water temperatures. Average water temperatures are irrelevant. The NMFS OCAP-BO requires 7-day average of the daily maximums. (7 DADM.) The EIS should use the temperature measurements required by NMFS.


OID
SSJID
SEWD 30

At subsection 9.4.2.2.2, in the section titled "Aquatic Habitat Conditions in the Stanislaus River from Goodwin Dam to San Joaquin River" (p. 9-131 to 9-133), the DEIS fails to account for the increase in water temperatures within New Melones Reservoir caused by releases made under Table 2E, which draw down the reservoir quicker and result in lower conditions for longer.

OID
SSJID
SEWD 31

Please let us know if you have any questions.

Very truly yours,


Tim O'Laughlin
O'LAUGHLIN & PARIS


Karna E. Harrigfeld
HERUM/CRABTREE

TW/llw

1

2 **1C.1.10.1 Attachments to Comments from Oakdale Irrigation District,** 3 **South San Joaquin Irrigation District, and Stockton East** 4 **Water District**

5 Attachments to the Oakdale Irrigation District, South San Joaquin Irrigation
6 District, and Stockton East Water District Comment letter are included in
7 Attachment 1C.2 located at the end of Appendix 1C.

8 **1C.1.10.2 Responses to Comments from Oakdale Irrigation District, South** 9 **San Joaquin Irrigation District, and Stockton East Water District**

10 **OID SSJID SEWD 1:** Comment noted.

11 **OID SSJID SEWD 2:** The text on page 1-10 in Chapter 1, Introduction, provides
12 a summary of information that is presented in Chapter 5, Surface Water
13 Resources and Water Supplies, and Appendix 3A, No Action Alternative: Central

1 Valley Project and State Water Project Operations. The text on page 1-10 of the
2 Draft EIS has been modified in the Final EIS to include a reference to additional
3 details in Chapter 5 and Appendix 3A.

4 **OID SSJID SEWD 3:** The text in this section of Chapter 1 of the Draft EIS
5 (Section 1.6) has been modified in the Final EIS to include a reference to the
6 ongoing SWRCB update of the Water Quality Control Plan.

7 As described in Section 1.6 of Chapter 1, Introduction, of the Draft EIS, it is
8 anticipated that substantial changes could occur to CVP and SWP operations as
9 future projects are implemented. It is anticipated that most of these future
10 projects have been identified in Section 3.5 of Chapter 3, Description of
11 Alternatives, including the Bay Delta Water Quality Control Plan Update. Many
12 of these future projects have not been fully defined and are not anticipated to be
13 operational until the late 2020s. If any of these future projects would substantially
14 change CVP operations, Reclamation would evaluate the need to request for
15 initiation of consultation under ESA with the USFWS and NMFS.

16 The future projects are being developed for different project objectives than the
17 purpose and need in this EIS for the coordinated long-term operation of the CVP
18 and SWP. Because the future operations under future projects have not been
19 finalized at this time; and because projects that would substantially change CVP
20 operations would require future consultations with USFWS and NMFS, it would
21 be pre-decisional to include these projects in the alternatives evaluated in this EIS.
22 Therefore, the alternatives under these future projects are considered in the
23 cumulative effects analysis in this EIS.

24 **OID SSJID SEWD 4:** In August 2012, Reclamation sent over 700 invitations to
25 participate as a NEPA cooperating agency in development of this EIS, including
26 an invitation to South San Joaquin Irrigation District (SSJID). The invitation
27 directed interested parties to respond to Reclamation with a written request.
28 Reclamation has no record of a letter from SSJID requesting to be a cooperating
29 agency. However, SSJID has been invited to update meetings and included in
30 preliminary review of written materials that were used in preparation of this EIS.

31 **OID SSJID SEWD 5:** The study referenced in this comment is presented in
32 Section 1.8 on page 1-15 of the DEIS as “Bay-Delta Water Quality Control Plan
33 Update.”

34 **OID SSJID SEWD 6:** The alternatives are described in detail in Sections 3.4.3
35 through 3.4.7 in Chapter 3, Description of Alternatives, including operational
36 details. The description of the alternatives is complex because the range of
37 alternatives represents a variety of methods to operate individual CVP and SWP
38 operational actions.

39 **OID SSJID SEWD 7:** The text on page 5-36, lines 10 through 16 has been
40 modified to be consistent with reference “SWRCB 2012” which is used in
41 development of the following paragraph.

42 **OID SSJID SEWD 8:** The analysis in the EIS is conducted using a monthly
43 analysis with an 82-year historic hydrology modified for projected climate

change, as described in Appendix 5A. The analysis includes evaluations of average monthly and annual conditions for the long-term average and averages under five water year types. The analysis does not consider firm yield concepts.

OID SSJID SEWD 9: The sentence referred to in this comment has been deleted from the Final EIS.

OID SSJID SEWD 10: Reclamation operates the CVP to meet water rights and other agreements, including the 1988 stipulation agreement related to the Stanislaus River.

OID SSJID SEWD 11: As stated on pages 5-36 and 5-37, additional CVP and SWP operational details, including discussions of SWRCB D-1641 objectives, are included in Appendix 3A. The Vernalis Adaptive Management Program allowed for additional sources of water, other than New Melones Reservoir, to be used to maintain flow in the San Joaquin River. After completion of this program, Reclamation does not have sufficient supply available in New Melones Reservoir to meet the inflow targets suggested by this comment.

Additional details about the recent droughts have been included in Section 5.3.3 of Chapter 5, Surface Water Resources and Water Supplies, and Section 6.3.3.6 of Chapter 6, Surface Water Quality, in the Final EIS to describe historical responses by CVP and SWP to these drought conditions.

OID SSJID SEWD 12: Information related to Goodwin Reservoir is included because the fisheries analysis evaluates reservoir fish in this water body in Chapter 9, Fish and Aquatic Resources.

OID SSJID SEWD 13: Please refer to the response to Comment OID SSJID SEWD 11.

OID SSJID SEWD 14: As described in Section 5A.2.1.1.4 of Appendix 5A, the water demands for Oakdale Irrigation District and South San Joaquin Irrigation District in the CalSim II model for Year 2030 operations are up to a total of 600,000 acre-feet per year depending upon land use. The model is used to analyze long-term conditions by the Year 2030, and does include an assumed water demand of 526,000 acre-feet for long-term conditions by Year 2030.

OID SSJID SEWD 15: The assumed water demands for water rights holders are not reduced in the CalSim II model assumptions, and water is delivered in accordance with water rights and agreements, as described in Appendix 5A, Section B. However, it is recognized that some alternatives considered in this EIS limit the ability to deliver water to meet the water right demands.

OID SSJID SEWD 16: The No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5 include climate change and sea level rise conditions. The EIS assumes that there will be no changes in regulatory or operational requirements due to climate change in the future. The EIS analyzes the alternatives in a comparative manner, and does not analyze any of the alternatives in an absolute manner. Therefore, the impact analysis compares conditions under the Alternatives 1 through 5 to the No Action Alternative; and conditions under the No Action Alternative and Alternatives 1 through 5 to the Second Basis of

Comparison. This comparative approach minimizes effects of climate change and sea level rise and indicates the differences in the comparisons of alternatives to the No Action Alternative and Second Basis of Comparison.

OID SSJID SEWD 17: The exceedance curves shown in Appendix 5A, Section C, CalSim II and DSM2 Model Results (see Figures C.6.1 through C.6.3) present the results of the CalSim II model runs, including the minimum and maximum results, for the New Melones Reservoir storage. The exceedance values at 10 percent increments are presented in Tables C.6.1 through C.6.6 which also are included in Appendix 5A, Section C.

OID SSJID SEWD 18: As described in Comment OID SSJID SEWD 17, the exceedance curves shown in Appendix 5A, Section C, CalSim II and DSM2 Model Results (see Figures C.6.1 through C.6.3) present the results of the CalSim II model runs, including the minimum and maximum results, for the New Melones Reservoir storage. The exceedance values at 10 percent increments are presented in Tables C.6.1 through C.6.6 which also are included in Appendix 5A, Section C.

OID SSJID SEWD 19: As described in Comment OID SSJID SEWD 17, the exceedance curves shown in Appendix 5A, Section C, CalSim II and DSM2 Model Results (see Figures C.6.1 through C.6.3) present the results of the CalSim II model runs, including the minimum and maximum results, for the New Melones Reservoir storage. The exceedance values at 10 percent increments are presented in Tables C.6.1 through C.6.6 which also are included in Appendix 5A, Section C.

OID SSJID SEWD 20: The No Action Alternative represents a continuation of existing policy and management actions at the time of the publication of the Notice of Intent in 2012. The Vernalis Adaptive Management Program allowed for additional sources of water, other than New Melones Reservoir, to be used to maintain flow in the San Joaquin River. After completion of this program, Reclamation does not have sufficient supply available in New Melones Reservoir to meet the inflow targets suggested by this comment.

OID SSJID SEWD 21: This information is presented in the Affected Environment to provide an understanding of potential changes in San Joaquin River water temperatures downstream of the confluence with the Stanislaus River. Changes in water temperatures at the confluence of the Stanislaus River and the San Joaquin River are calculated in the EIS, and are indicative of potential changes in fisheries conditions on the San Joaquin River downstream of the Stanislaus River. It is recognized that ambient air temperature conditions become a more dominant factor than upstream water temperatures as the San Joaquin River enters the Delta.

OID SSJID SEWD 22: As described in the EIS, the model results indicate that there will be periods that the temperature objectives would not be achieved under the No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5. The EIS considers the changes in Stanislaus River water temperatures under Alternatives 1 through 5 as compared to the No Action Alternative and

- 1 Second Basis of Comparison and under the No Action Alternative as compared to
2 the Second Basis of Comparison (see Figures 6B.17.1 through 6B.17.12 and
3 6B.18.1 through 6B.18.12).
- 4 **OID SSJID SEWD 23:** In Chapter 9, Fish and Aquatic Resources, references to
5 Goodwin Lake has been replaced by references to the water body formed by
6 Goodwin Dam.
- 7 **OID SSJID SEWD 24:** In response to this comment, a quantitative description of
8 the temporal and geographic distribution of fall-run Chinook Salmon spawning in
9 the Stanislaus River has been added to Section 9.3.4.17.1 of the Draft EIS and
10 somewhat conflicting language has also been removed from this section.
- 11 **OID SSJID SEWD 25:** The text referenced in this comment has been modified in
12 the Final EIS to include a discussion of straying of Chinook Salmon in the
13 Stanislaus River.
- 14 **OID SSJID SEWD 26:** In response to this comment, text has been added to the
15 steelhead Section 9.3.4.17.1 describing the timing and numbers of steelhead
16 observed in the Stanislaus River. The reference to spawning above Oakdale has
17 been replaced with “between Goodwin Dam and Orange Blossom Bridge.”
- 18 **OID SSJID SEWD 27:** The paragraph referenced in this comment has been
19 deleted in the Final EIS.
- 20 **OID SSJID SEWD 28:** The text referenced in this comment has been modified in
21 the Final EIS to include the analysis of dissolved oxygen and migration of adult
22 Chinook Salmon with references to Lee and Jones-Lee (2003) and SJTA (2012).
- 23 **OID SSJID SEWD 29:** It is acknowledged that predation is an important factor
24 influencing the survival of juvenile salmonids in the Stanislaus River. The EIS
25 addresses predation as a stressor on listed species and discusses it specifically for
26 each of the water bodies analyzed, including the Stanislaus River. The EIS also
27 discusses predation in terms of predator management (see Draft EIS section
28 starting on page 9-274).
- 29 **OID SSJID SEWD 30:** The 7-day average of the daily maximums (7 DADM)
30 prescribed in the NMFS OCAP BO is a management criterion designed to be
31 measured in real-time.
- 32 The Draft EIS uses average monthly temperatures to provide a comparison on
33 ability of operations considered under alternatives to meet temperature objectives
34 for species. As described in Section 5A.A.3.6, temperature modeling is
35 subsequent to CalSim II modeling that simulates operations on a monthly basis.
36 As mentioned in Section 5A.A.3.5, regarding CalSim II model results and model
37 results interpretations dependent on CalSim II, there are certain components in
38 the model that are downscaled to daily time step (simulated or approximated
39 hydrology) such as an air-temperature-based trigger for a fisheries action, the
40 results of those daily conditions are always averaged to a monthly time step (for
41 example, a certain number of days with and without the action is calculated and
42 the monthly result is calculated using a day-weighted average based on the total
43 number of days in that month), and operational decisions based on those

1 components are made on a monthly basis. Therefore, reporting sub-monthly
2 results from CalSim II or from any other subsequent model that uses monthly
3 CalSim results as an input is not considered an appropriate use of model results.

4 It is acknowledged that temperature operations in real-time would be dependent
5 on daily variations of meteorological conditions, reservoir operations, fish
6 presence, and other external factors such as prolonged drought. It is unfortunately
7 not possible to capture all of these on a daily basis in a model. Therefore, the
8 Draft EIS uses model results in a comparative manner to provide a trend analysis
9 rather than interpreting these results as absolute effects, which would be
10 speculative. In addition, this comparative approach should capture the same
11 differences regardless of whether monthly average temperatures or 7DADM were
12 used. This level of detail is deemed appropriate for a NEPA analysis.

13 **OID SSJID SEWD 31:** Changes in water temperature depend on upstream
14 reservoir storage, monthly flow patterns, and residence times in the downstream
15 reservoirs. Detailed discussion of such changes are provided in the EIS.

1 **1C.1.11 Placer County Water Agency**



PLACER COUNTY WATER AGENCY
SINCE 1857
BOARD OF DIRECTORS
Gray Allen, District 1
Primo Santini, District 2
Mike Lee, District 3
Robert Dugan, District 4
Joshua Alpine, District 5
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September 23, 2015

Mr. Ben Nelson
Natural Resources Specialist
Bureau of Reclamation, Bay-Delta Office
801 I Street, Suite 140
Sacramento, CA 95814-2536

SUBJECT: Placer County Water Agency (PCWA) Comments

Dear Mr. Nelson:

The purpose of this letter is to present PCWA's comments to the Bureau of Reclamation (Reclamation) Draft Environmental Impact Statement for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project (DEIS). Comments pertain exclusively to the Sacramento River Water Reliability Project (SRRP) as described and analyzed in Reclamation's Biological Assessment on the Continued Long-term Operations of the Central Valley Project and the State Water Project, dated August 2008 (2008 BA).

PCWA 1

Comments to the DEIS. Considering the extent of supporting studies, analyses and authorities, and the continuing commitment by PCWA and partner agencies to complete the project, the SRRP should be incorporated into Reclamation's Final Environmental Impact Statement (FEIS) and Record of Decision (ROD). Specifically:

PCWA 2

1. If there is no relief to the current court-ordered deadline (December 1, 2015) for issuing the ROD, then the SRRP should be included as a related project in the FEIS and ROD as described in DEIS Chapter 1, Section 1.8 and relevant parts.

2. Should the court grant an extension of the current December 1, 2015, deadline, then the SRRP should be included in Reclamation's cumulative effects analysis for the FEIR and ROD as a reasonably foreseeable future project (Reference DEIS Chapter 3, Section 3.5 and relevant parts). PCWA is prepared to provide modeling and other technical support to Reclamation in completing an updated cumulative effects analysis, as requested.

PCWA 3

2

Basis for Comments:

- The Final Environmental Impact Statement (FEIS) and Planning Report for the American River Water Resources Investigation (ARWRI), completed in 1997 by Reclamation and the Sacramento Metropolitan Water Authority¹, identified an environmentally preferred alternative for future water supply needs that includes additional surface water diversions and regional conjunctive management.
- Based upon an extensive analysis, the Sacramento Water Forum Agreement, dated April 24, 2000 (WFA) defined a wide range of water management actions by regional water agencies and environmental organizations to improve water supply reliability and resource protection within the American River and adjacent watersheds. One principal objective in the WFA involves diversions on the Sacramento River to reduce future diversions from the American River.
- Public Law 106-554 dated December 21, 2000, directed the Reclamation to conduct a feasibility study of a Sacramento River diversion facility consistent with the project identified in WFA. The goal of the study was to develop a water supply plan that was consistent with the WFA objectives of pursuing a Sacramento River diversion to meet water supply needs of the Placer-Sacramento region and promoting ecosystem preservation along the lower American River.
- SRRP effects were analyzed as part of the 2008 BA. The SRRP was subsequently addressed in the National Marine Fisheries Service (NMFS) "Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project", dated June 4, 2009 (NMFS BiOp).
- Reclamation completed an administrative draft Environmental Impact Statement for the study. However, work was suspended in 2012 due mainly to lack of funding by the non-federal cost share partners. Pending development of an alternative funding plan and reformulated approach to the project, and considering the immediacy of the then-applicable court-ordered date for producing a ROD (December 1, 2013), PCWA accepted that Reclamation's National Environmental Policy Act (NEPA) analysis would assume that all 35,000 acre-feet of PCWA's CVP contract supplies are diverted from the American River Pump Station (ARPS) on the North Fork, American River.
- Since that time, and in parallel with Reclamation's extended NEPA process, PCWA has continued to collaborate with other regional agencies to fund, develop and implement a reformulated approach to the SRRP. Project partners

PCWA 3
continued

¹ Now the Regional Water Authority (RWA)

include PCWA, City of Roseville (Roseville), City of Folsom (Folsom), City of Sacramento (Sacramento), Sacramento County Water Agency (SCWA), Rio Linda/Elverta Community Water District (RLECWD), Sacramento Suburban Water District (SSWD), Citrus Heights Water District (CHWD), El Dorado County Water Agency (EDCWA), San Juan Water District (SJWD) and California American Water Company (CalAm). The Sacramento Water Forum is engaged as a partner as well. The project partners are also actively pursuing Reclamation participation and assistance in the SRRP.

PCWA 3
continued

- Participating agencies are committed to project completion. On March 20, 2015, the partners signed a cost-sharing agreement for the Development of a Project Framework Document for a new Sacramento River Water Supply. The respective Boards of Directors for PCWA, RLECWD, SCWA, SJWD, SSWD, CHWD, EDCWA, CalAm, the City Councils of Sacramento, Roseville and Folsom have all executed this agreement in support of the project.
- The current project is consistent structurally and operationally with corresponding project descriptions in the WFA, P.L. 106-554 and the 2008 BA. The initial planning report was completed in August 2015. Detailed planning and environmental analysis is scheduled to be completed by the end of 2018. Implementation (Procurement, Design, and Construction) is tentatively scheduled to begin early 2019 and continue through 2023. The project is consistent with adaption and mitigation strategies identified in the draft Sacramento – San Joaquin Basin Plan, and is expected to be a central component of the Regional Drought Contingency Plan currently being developed by PCWA and RWA under grant from Reclamation's WaterSMART Program.

Thank you for your consideration. Please let me know if PCWA can provide any additional clarification. I can be reached at afecko@pcwa.net or (530) 823-4490.

Sincerely

PLACER COUNTY WATER AGENCY



Andrew Fecko
Director of Resource Development

AF:vf

Appendix 1C: Comments from Regional and Local Agencies and Responses

cc: Rich Plecker, City of Roseville
Marcus Yasutake, City of Folsom
Brett Ewart, City of Sacramento
Darrel Eck, Sacramento County Water Agency
Mary Henrici, Rio Linda/Elverta Community Water District
Rob Roscoe, Sacramento Suburban Water District
Bob Churchill, Citrus Heights Water District
Ken Payne, El Dorado County Water Agency
Shauna Lorange, San Juan Water District
Audie Foster, California American Water Company
Craig Muehlberg, Acting Manager, Bay Delta Office, Bureau of Reclamation
Drew Lessard, Area Manager, Central California Area Office, Bureau of Reclamation

G:/vf2015cor.

1 **1C.1.11.1 Responses to Comments from Placer County Water Agency**

2 **PCWA 1:** Comment noted.

3 **PCWA 2:** The Sacramento River Water Reliability Project has been added to the
4 list of related projects in Section 3.5 of Chapter 3, Description of Alternatives,
5 and in the cumulative effects analyses in Chapters 5 through 21 of the EIS.
6 Results of the impact analysis for all of the alternatives will be considered by
7 Reclamation during preparation of the Record of Decision.

8 **PCWA 3:** This project is still under development and is appropriate for inclusion
9 in the cumulative effects analysis. The cumulative effects analysis for the EIS is a
10 qualitative analyses due to the preliminary nature of the programs, projects, and
11 policies considered under this analysis. On October 9, 2015, the District Court
12 granted a very short time extension to address comments received during the
13 public review period, and requires Reclamation to issue a Record of Decision on
14 or before January 12, 2016. This current court ordered schedule does not provide
15 sufficient time for Reclamation to incorporate detailed information about this
16 project. However, information related to this project from existing publically-
17 available references will be used in the analysis of cumulative effects during
18 preparation of the Final EIS.

1 **1C.1.12 City of Sacramento**



September 29, 2015

Mr. Ben Nelson
Bureau of Reclamation
Bay-Delta Office
801 I Street, Suite 140
Sacramento, CA 95814-2536

By U. S. Mail and E-Mail to: BCNelson@usbr.gov

Re: Comments on the Coordinated Long-Term Operation of the Central Valley Project and State Water Project Draft EIS

The City of Sacramento (City) and the US Bureau of Reclamation (Reclamation) are party to a settlement and operating contract (Contract No. 14-06-200-6497, hereafter Settlement Contract) wherein the City gave up certain rights in exchange for Reclamation's operation of Folsom Reservoir so as to make water available to the City in accordance with the contractual schedule. The City diverts the water made available under the Settlement Contract largely at its Fairbairn facility on the Lower American River. The City also has senior water rights on both the Sacramento and American Rivers.

SAC 1

In practice, Reclamation and the City have a good record of cooperative communication and operations in support of their contractual relationship and the City's water rights. The Draft EIS needs to reflect Reclamation's obligation to operate in compliance with the Settlement Contract and applicable water right priorities and laws. In several respects, it does not appear to do so.

SAC 2

The City submits these comments in furtherance of continued operations in cooperation with Reclamation.

SAC 3

- The DEIS shows significant impacts to Folsom Reservoir, including decreased storage, decreased reliability, and increased incidence of "dead pool" conditions. Figure C-4-2, entitled Folsom Lake, End of September Storage (Appendix 5, Page 5A-179), suggests that Folsom Lake would reach dead pool conditions under the alternatives approximately three to five percent of the time. Allowing Folsom Lake to reach dead pool conditions is not consistent with Reclamation's obligations under the Settlement Contract.

- The DEIS appears to show CVP operations placing a disproportionate burden on Folsom Reservoir by using it as a "first responder" to meet Delta water quality standards. Folsom Reservoir is not a sufficiently large resource to sustain these demands and reliably meet local obligations including that of the City.

SAC 4

- The DEIS's hydrological analysis does not analyze how the CVP and SWP would be operated to provide Settlement Contract deliveries during multi-year droughts, and, as a result, does not properly analyze the impacts of the proposed action on Folsom Reservoir storage and water to be made available for diversion by the City.

SAC 5

City of Sacramento Department of Utilities
916-808-1400
1395 35th Avenue
Sacramento, CA 95822

2

1C.1.12.1 Responses to Comments from City of Sacramento

SAC 1: Comment noted.

SAC 2: Comment noted.

SAC 3: The CVP and SWP operations prioritize meeting federal and state statutory and regulatory requirements and obligations to senior water rights holders, including the City of Sacramento prior to deliveries of water to other CVP and SWP water contractors. The modeling analyses presented in the EIS include these prioritizations for long-term operation of the CVP and SWP without inclusion of changes that could be developed for specific extreme flood or drought events. Water is delivered every year under the water right contract to the City of Sacramento in the 82-year hydrology analyzed with the CalSim II model in the EIS.

Reclamation is aware of the storage and diversion limitations that exist for the intakes in Folsom Lake during drought periods when Reclamation may be allocating and delivering water in consideration of federal and state regulatory requirements, including water rights. Droughts have occurred throughout California's history, and are constantly shaping and innovating the ways in which Reclamation and DWR balance both federal and state regulations, public health standards and urban and agricultural water demands. The most notable droughts in recent history are the droughts that occurred in 1976-77, 1987-92, and the ongoing drought. More details have been included in Section 5.3.3 of Chapter 5, Surface Water Resources and Water Supplies, in the Final EIS to describe historical responses by CVP and SWP to these drought conditions, including implementation of a barge and pump system in Folsom Lake to allow diversions when low water surface elevations would cause capacity issues for existing intakes.

SAC 4: As described in Appendix 3A, No Action Alternative: Central Valley Project and State Water Project Operations, in the EIS, conditions in the Delta can change rapidly. Weather conditions combined with tidal action can quickly affect Delta salinity conditions, and therefore, the Delta outflow required to maintain water quality criteria. If, in this circumstance, it is decided the reasonable course of action is to increase upstream reservoir releases, then generally water is released from Folsom Reservoir first because the released water will reach the Delta before flows released from other CVP and SWP reservoirs. Lake Oroville water releases require about 3 days to reach the Delta, while water released from Shasta Lake requires 5 days to travel from Keswick Reservoir to the Delta. As water from the other reservoirs arrives in the Delta, Folsom Reservoir releases are generally adjusted downward. Water releases from Folsom Lake are determined based upon water rights in the American River watershed and federal and state statutory and regulatory requirements related to the operation of the CVP and SWP.

- 1 **SAC 5:** As described in the response to Comment SAC 3, water is delivered
2 every year under the water right contract to the City of Sacramento in the 82-year
3 hydrology analyzed with the CalSim II model in the EIS. The low Folsom Lake
4 water storage conditions that occur during drought periods under the No Action
5 Alternative, Second Basis of Comparison, and Alternatives 1 through 5 in the EIS
6 occur after water is delivered in the CalSim II model to the City of Sacramento
7 and other water rights holders in the American River watershed.

1 **1C.1.13 San Luis & Delta-Mendota Water Authority, Westlands**
2 **Water District, and San Joaquin River Exchange**
3 **Contractors Water Authority**

San Luis & Delta-Mendota Water Authority



P.O. Box 2157
Los Banos, CA 93635
Phone: (209) 826-9696
Fax: (209) 826-9698

Westlands Water District



3130 N. Fresno Street
P.O. Box 6056
Fresno, CA 93703-6056
Phone: (559) 224-1523
Fax: (559) 241-6277

San Joaquin River Exchange Contractors Water Authority



September 29, 2015

VIA U.S. MAIL AND EMAIL

Mr. Brian Nelson
Bureau of Reclamation, Bay-Delta Office
801 I Street, Suite 140
Sacramento, CA 95814-2536
Email: bcnelson@usbr.gov

Re: Draft Environmental Impact Statement for the Coordinated Long-term
Operation of the Central Valley Project and State Water Project

Dear Mr. Nelson:

The San Luis & Delta-Mendota Water Authority, Westlands Water District, and the San Joaquin River Exchange Contractors Water Authority appreciate the opportunity to comment on the Draft Environmental Impact Statement for the Coordinated Long-term Operation of the Central Valley Project and State Water Project ("Draft EIS").¹ In its coming Record of Decision, the United States Bureau of Reclamation ("Reclamation") will be making policy decisions on a matter of vital importance to the future of California, including its protected fish and wildlife species, millions of its people, and millions of acres of its prime farm land.

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Reclamation must make a new and thoughtful decision regarding how it will operate the Central Valley Project ("CVP"), in coordination with the Department of Water Resources' operation of the State Water Project ("SWP"), to serve project purposes while meeting its obligations under section 7 of the federal Endangered Species Act ("ESA"). No one can afford a

¹ The member agencies of the San Luis & Delta-Mendota Water Authority and the San Joaquin River Exchange Contractors Water Authority are listed in the attached Exhibit A.

reflexive, status quo re-adoption of the policy decisions Reclamation made some seven years ago to adopt and implement the existing reasonable and prudent alternatives. The Draft EIS is in response to court orders entered in litigation brought by the Authority, Westlands and other water contractors challenging those decisions. As the courts have found, those decisions were unlawful, because they were made without the benefit of any environmental review under the National Environmental Policy Act ("NEPA"). Further, those decisions relied upon limited and now outdated science, and were not informed by the critical social and environmental impacts realized over the past seven years of implementing the existing reasonable and prudent alternatives. The seven years since have shown devastating adverse impacts from lost water supply due to the ESA restrictions, but no recovery in the protected species. Indeed, despite implementation of the ESA restrictions, the listed species have continued to decline. It is past time for a new approach.

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continued

The current NEPA review provides Reclamation with an opportunity to make a more informed and better decision than it did seven years ago, an opportunity Reclamation should embrace. NEPA requires no less. As the Council on Environmental Quality's regulations dictate, "[a]n environmental impact statement is more than a disclosure document. It shall be used by federal officials in conjunction with other relevant material to plan actions and make decisions." 40 C.F.R. § 1502.1. Reclamation's environmental impact statement must analyze and inform the public and policy makers of whether and what changes to CVP and SWP operations are necessary to meet the requirements of the ESA, the available alternatives, the trade-offs inherent among the available alternatives, and potential mitigation for resulting impacts. The environmental impact statement should provide the information necessary to a decision that will maximize the ability of the CVP to achieve all its authorized purposes, while still providing the protection due listed species under the ESA.

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We are disappointed that the Draft EIS ignores this opportunity. Although the Draft EIS states that a purpose of the proposed action is to "continue the operation of the CVP in coordination with operation of the SWP, for its authorized purposes," that purpose is not reflected in the alternatives or analysis. It is a lengthy document that teaches very little, and falls well short of what NEPA requires. Some of the more significant deficiencies of the Draft EIS are:

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- It does not critically examine the need for, or expected benefits for listed species of, the existing reasonable and prudent alternatives in the biological opinions, nor does it offer a meaningful comparison of the projected effects and benefits of alternatives.
- It does not identify any mitigation for lost CVP and SWP water supply, despite acknowledging that the existing reasonable and prudent alternatives will result in an average annual loss of over one million acre-feet of project water, and despite the devastating impacts on the human environment already caused by resulting water shortages, including overdrafting groundwater basins, land subsidence, and degraded air quality.
- It attempts to deny any significant future water supply impacts from implementing the existing reasonable and prudent alternatives by unreasonably

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Appendix 1C: Comments from Regional and Local Agencies and Responses


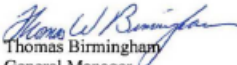

	SLDMWA WWD SJRECWA 5
assuming that increased use of groundwater will entirely substitute for lost CVP and SWP water supply.	continued
<ul style="list-style-type: none">• It does not explain the significant scientific uncertainty underlying the existing biological opinions and similar prescriptions, and hence does not inform the public or decision makers of the true nature and range of the largely policy-based choices to be made regarding future operations.	SLDMWA WWD SJRECWA/ 6
<ul style="list-style-type: none">• It neglects to consider an integrated approach to meeting the needs of both the delta smelt and salmonid species, to remedy the sometimes conflicting requirements of the two existing biological opinions.	SLDMWA WWD SJRECWA/ 7
We provide more detailed comments supporting these and additional points in the Exhibits attached to this letter. ² Significant revisions and additional analyses are required for Reclamation to make a well-informed decision, and to meet NEPA's requirements.	SLDMWA WWD SJRECWA/ 8
All will benefit if Reclamation takes the opportunity before it and performs the NEPA review necessary to adequately inform its coming decisions. Under the current remand schedule in the delta smelt case, Reclamation's Record of Decision is due by December 1, 2015. As we have noted in prior comments, that is not enough time to make needed revisions to the Draft EIS. These parties are open to an extension of the current remand deadline, which of course the court would have to approve. We invite further discussion with Reclamation on this issue.	SLDMWA WWD SJRECWA/ 9
Thank you for your consideration of these comments.	
Sincerely,	
	
Daniel G. Nelson Executive Director San Luis & Delta-Mendota Water Authority	
	
Thomas Birmingham General Manager Westlands Water District	
	
Steve Chedester Executive Director San Joaquin River Exchange Contractors Water Authority	SLDMWA WWD SJRECWA 10
<hr/> ² The Authority submitted written comments on June 28, 2012 in response to the notice of intent and scoping, on May 3, 2013 in response to the first version of the administrative draft environmental impact statement, and on July 14, 2015 in response to the second version of administrative draft environmental impact statement. We incorporate those prior comments, including all attachments thereto, in these comments as well.	

EXHIBIT A

San Luis & Delta-Mendota Water Authority Member Agencies

The Authority's members are:

Banta-Carbona Irrigation District; Broadview Water District; Byron Bethany Irrigation District (CVPSA); Central California Irrigation District; City of Tracy; Columbia Canal Company (a Friend); Del Puerto Water District; Eagle Field Water District; Firebaugh Canal Water District; Fresno Slough Water District; Grassland Water District; Henry Miller Reclamation District #2131; James Irrigation District; Laguna Water District; Mercy Springs Water District; Oro Loma Water District; Pacheco Water District; Pajaro Valley Water Management Agency; Panoche Water District; Patterson Irrigation District; Pleasant Valley Water District; Reclamation District 1606; San Benito County Water District; San Luis Water District; Santa Clara Valley Water District; Tranquillity Irrigation District; Turner Island Water District; West Side Irrigation District; West Stanislaus Irrigation District; Westlands Water District.

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San Joaquin River Exchange Contractors Water Authority Member Agencies

The Exchange Contractors' members are:

Central California Irrigation District; San Luis Canal Company; Firebaugh Canal Water District; Columbia Canal Company

EXHIBIT B

DETAILED COMMENTS REGARDING DRAFT EISI. THE DRAFT EIS IS FUNDAMENTALLY FLAWEDA. The Draft EIS Fails To Analyze An Important Aspect Of The Decision Facing Reclamation – What Changes To CVP Operations Are, Or Are Not, Necessary To Comply With ESA Section 7

The review provided in the Draft Environmental Impact Statement for the Coordinated Long-term Operation of the Central Valley Project and State Water Project ("Draft EIS") pursuant to the National Environmental Policy Act ("NEPA") is inconsistent with the district court's rulings in the *Consolidated Smelt Cases* and *Consolidated Salmonid Cases* and with Reclamation's obligations on remand. The court found that Reclamation violated NEPA when it adopted and implemented major changes to Central Valley Project ("CVP") and State Water Project ("SWP") (collectively, the "Projects") operations pursuant to biological opinions ("BiOps"), changes that caused significant adverse effects on the quality of the human environment, without doing any NEPA review. To understand and inform the public and policymakers regarding its coming decision, Reclamation must consider whether and how the continued operations of the CVP and SWP should be modified to ensure compliance with the Endangered Species Act ("ESA"). Reclamation must engage in a fundamental reanalysis of the effect of CVP and SWP operations on the listed species, and the necessity for and efficacy of any measures intended to address such effects.

In recent years, changes to CVP and SWP operations that purportedly were "necessary" to comply with the ESA have severely impaired the ability of the CVP and SWP to meet their respective authorized purposes, with disastrous consequences. Reclamation's present NEPA review should therefore be keenly focused on identifying actions it and the Department of Water Resources ("DWR") can take to better serve all authorized purposes while still meeting the requirements of the ESA. In performing this assessment, Reclamation should generate and carefully consider the data and analysis of impacts and alternatives in the NEPA process, including new available scientific data and other changes since 2008. The task on remand is not to simply accept the reasonable and prudent alternatives ("RPAs") of the BiOps, but rather to analyze anew what, if any, modifications to CVP and SWP operations are necessary to avoid jeopardy to the species. Reclamation's analysis must consider what effect the coordinated operations of the CVP and SWP actually have on species survival and recovery, what measures are proposed to reduce or compensate for such effects, what the data show about the likely efficacy of those measures, and what other effects those measures will cause including through reductions of water supply. That analysis should distinguish between actions that are necessary to comply with the mandates of ESA section 7 (i.e., to avoid jeopardizing the species or adversely modifying its critical habitat), and other actions that might provide some additional protection or benefit for listed species, but are not necessary to comply with the ESA.

The Draft EIS suggests that it is intended to be used to inform Reclamation's operation of the CVP. The Draft EIS states: "This EIS may be used by Reclamation or cooperating agencies

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that are participating in the preparation of this EIS to inform future decisions related to operation of the CVP and SWP, and implementation of the RPAs in the 2008 USFWS BO and 2009 NMFS BO." Draft EIS at ES-5. However, the Draft EIS does not critically examine the conclusions of the BiOps, or the RPAs. It accepts them as a given, rather than using the NEPA process to analyze the available data and inform decisions regarding what CVP and SWP operations are actually necessary to meet Reclamation's ESA obligations. In order to serve the purposes of NEPA, the Draft EIS must be revisited and revised, to allow an up-to-date analysis that takes the requisite "hard look" at what, if any, modifications to CVP and SWP operations are necessary to comply with the standards of ESA section 7. *South Fork Band Council of Western Shoshone of Nevada v. U.S. Dep't of Interior*, 588 F.3d 718, 726-27 (9th Cir. 2009). That review should expressly note scientific uncertainties and gaps in data, and indicate the significance of shortcomings in the data for the ultimate decision.

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Reclamation is not bound to, and cannot, simply implement the reasonable and prudent alternatives prescribed by the wildlife agencies in the 2008 and 2009 BiOps. Instead, Reclamation must decide for itself what is or is not required to insure that its actions comply with its obligations under the ESA. 16 U.S.C. § 1536(a)(2); *Wild Fish Conservancy v. Salazar*, 628 F.3d 513, 518-19. In making that determination, Reclamation "may not rely solely on [the BiOps] to establish conclusively its compliance with its substantive obligations under section 7(a)(2)." *Pyramid Lake Paiute Tribe of Indians v. U.S. Dep't of Navy*, 898 F.2d 1410, 1415 (9th Cir. 1990). "[T]he action agency must not blindly adopt the conclusions of the consultant agency." *City of Tacoma, Wash. v. Fed. Energy Regulatory Comm'n*, 460 F.3d 53, 76 (D.C. Cir. 2006). This is because in the end, "the ultimate responsibility for compliance with the ESA falls on the action agency." *Id.*; see also 16 U.S.C. § 1536(a)(1)-(2).

Reclamation must now reconsider whether and how the continued operations of the CVP and SWP should be modified to ensure compliance with the ESA. As Reclamation considers the 2008 and 2009 BiOps anew, it should "determine whether and in what manner to proceed with the action in light of its section 7 obligations and the Service[s'] biological opinion[s]." 50 C.F.R. § 402.15(a). Reclamation's fresh review of the 2008 and 2009 BiOps and RPAs must not be arbitrary, capricious, or contrary to law, or Reclamation will violate its independent, substantive duty to comply with the ESA. Such independent liability will attach, for example, where the action agency is in possession of "new information" rendering the BiOp suspect. *Wild Fish Conservancy*, 628 F.3d at 532; *Pyramid Lake*, 898 F.2d at 1415. Such liability may also attach where the BiOp is based on data that contradicts the action agency's own data or where the action agency, through the BiOp, failed to consider all relevant factors. See *Defenders of Wildlife v. U.S. Env't'l Prot. Agency*, 420 F.3d 946, 976 (9th Cir. 2005); *Res. Ltd., Inc. v. Robertson*, 35 F.3d 1300, 1305 (9th Cir. 1993); *Pac. Coast Fed'n of Fishermen's Ass'ns v. Gutierrez*, 606 F. Supp. 2d 1122, 1189, 1191 (E.D. Cal. 2008).

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Reclamation must review the scientific data underlying the prescriptions of the BiOps, the scientific data available today, and the experience of the past seven years, in order to determine what is necessary to meet its obligations under ESA section 7. The Draft EIS is inadequate to serve that purpose, and hence must be substantially revised to adequately inform Reclamation's decision.

B. The Draft EIS Fails To Identify The Proposed Action

The Draft EIS does not clearly identify the “proposed action.” The Department of Interior’s regulations for implementation of NEPA mandate that an EIS include a “description of the proposed action.” 43 C.F.R. § 46.415(a)(2). The regulations define the “proposed action” as “the bureau activity under consideration” and the regulations state that the “proposed action” must be “clearly described in order to proceed with NEPA analysis.” 43 C.F.R. § 46.30.

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Apparently, Reclamation has not yet decided upon a proposed action. The Draft EIS does not contain a section entitled “proposed action,” nor does the document ever clearly identify the proposed action. The Draft EIS states: “This Draft EIS evaluates potential long-term direct, indirect, and cumulative impacts on the environment that could result from implementation of modifications to the continued long-term operation of the CVP and SWP.” Draft EIS at 1-1. Reclamation must decide upon a proposed action for the NEPA process. For example, unless and until Reclamation identifies and describes the “proposed action” it is difficult to imagine how Reclamation can develop a reasonable range of alternatives to the proposed action.

C. The No Action Alternative Is Incorrect

An EIS must “[i]nclude the alternative of no action.” 40 C.F.R. § 1502.14(d). In an EIS, the action alternatives are compared to the no action alternative to measure the impacts of each action alternative. *See, e.g., Center for Biological Diversity v. U.S. Dept. of the Interior*, 623 F.3d 633, 642, (9th Cir. 2010) (“A no action alternative in an EIS allows policymakers and the public to compare the environmental consequences of the status quo to the consequences of the proposed action. The no action alternative is meant to ‘provide a baseline against which the action alternative[]’...is evaluated. *Id.* A no action alternative must be considered in every EIS. *See* 40 C.F.R. § 1502.14(d).”).

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According to Reclamation’s NEPA Handbook, “[n]o action’ represents a projection of current conditions and reasonably foreseeable actions to the most reasonable future responses or conditions that could occur during the life of the project without any action alternatives being implemented.” Reclamation’s NEPA Handbook (Feb. 2012) at 8-8. Moreover,

[t]he no action alternative should not automatically be considered the same as the existing condition of the affected environment because reasonably foreseeable future actions may occur whether or not any of the project action alternatives are chosen. When the no action alternative is different from the existing condition, as projected into the future, the differences should be clearly defined. Differences could result from other water development projects, land use changes, municipal development, or other actions. “No action” is, therefore, often described as “the future without the project.”

Id.

The Draft EIS's No Action Alternative does not allow the decisionmakers or the public to evaluate and compare the environmental consequences of implementing the BiOps and RPAs, because it *includes* the RPAs. The Draft EIS states:

For this EIS, the No Action Alternative is based upon the continued operation of the CVP and SWP in the same manner as occurred at the time of the publication of the Notice of Intent in March 2012. Thus, the No Action Alternative consists of the coordinated long-term operation of the CVP and SWP, including full implementation of the RPAs in the 2008 USFWS BO and 2009 NMFS BO because Reclamation provisionally accepted the BOs in 2008 and 2009, respectively, and is implementing the RPAs. The No Action Alternative also includes changes not related to the long-term operation of the CVP and SWP or implementation of the RPAs in the 2008 USFWS BO and 2009 NMFS BO . . .

Draft EIS at 3-3. This description of the No Action Alternative is inconsistent with the district court's rulings regarding Reclamation's failure to comply with NEPA, and will result in an EIS that fails to comply with law. *See, e.g., Conservation Council for Hawaii v. NMFS*, --- F. Supp. 3d ---, 2015 WL 1499589 at *25 (D. HI Mar. 31, 2015) (finding no action alternative unlawful because it "assum[ed] the very take activities the Navy was proposing to engage in").

The Draft EIS's No Action Alternative essentially pretends that the litigation and the court rulings that resulted in the remand never happened. The Draft EIS states that "[b]ecause the RPAs were provisionally accepted and the No Action Alternative represents a continuation of existing policy and management direction, the No Action Alternative includes the RPAs." Draft EIS at ES-8. However, that rationale ignores the reality that Reclamation was required, but failed, to conduct NEPA review *before* accepting and implementing the RPAs. The "existing policy and management direction" is unlawful because it was adopted without prior NEPA review.

The district court ruled that Reclamation violated NEPA by significantly modifying CVP operations to meet ESA requirements without first performing NEPA analysis of the impacts of such modifications or alternatives to such modifications. To remedy the error found by the court, Reclamation must place itself back in the position it was in before that error occurred (i.e. before provisionally adopting the BiOps without performing any NEPA analysis). Accordingly, in order to respond to the court's ruling on remand, here the "no action" alternative should be defined to include operations consistent with Reclamation's and DWR's obligations and all legal requirements *except* any ESA-related requirements that involve major changes to operations. Under this definition of "no action," CVP and SWP operations would continue in compliance with other regulatory requirements (e.g. D-1641 as modified by applicable laws, including Wilkins Slough requirements, FERC license requirements, American River in-river flow requirements, etc.). Comparing this no action alternative to the action alternatives developed

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during the NEPA process will provide the most comprehensive and appropriate disclosure of the environmental impacts of the various action alternatives to comply with ESA requirements.¹

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Treating the BiOps as any part of the No Action Alternative is a highly inadvisable course of action, because it does not cure the NEPA violation found by the district court. It instead contradicts the district court's ruling, because the NEPA analysis does not measure and disclose the impacts of changes to CVP and SWP operations to comply with the ESA. And it defeats the purpose of the No Action Alternative—to provide a meaningful comparative scenario with which to gauge the impacts of the action alternatives. As the Ninth Circuit observed in a similar context, “[a] no action alternative in an EIS is meaningless if it assumes the existence of the very plan being proposed.” *Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1038 (9th Cir. 2008). To comply with the judgments in the *Consolidated Smelt Cases* and *Consolidated Salmonid Cases*, the No Action Alternative must be revised.

The definition of the No Action Alternative (and indeed all alternatives) is incorrect for a second reason. The Draft EIS provides that it “does not address the CVP facilities associated with Millerton Lake, including the Madera and Friant-Kern canals and their service areas, and the San Joaquin River Restoration Program because these facilities are not considered in the consultations related to the 2008 USFWS BO and 2009 NMFS BO.” Draft EIS at 3-16. Appendix 3A repeats that “Friant Division operations are not analyzed in th[e] EIS.” Draft EIS at 3A-64. But Friant Division operations should be included and analyzed in the EIS.

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The Friant Division is a part of the CVP. It is operating now, and presumably it will be operating for the foreseeable future. Its operations will continue to affect the overall operations of the CVP and coordinated operations of the SWP. By failing to include Friant Division operations, the Draft EIS is taking an incomplete look at CVP operations, and may be missing important impacts and available alternatives. That omission violates NEPA. It is no excuse that the ESA consultations concluded in 2008 and 2009 failed to include Friant Division operations. Those ESA consultation failings does not warrant creating a NEPA defect as well.

D. The Second Basis Of Comparison Is Not A Substitute For The Correct No Action Alternative

The Authority, Westlands, and the Exchange Contractors appreciate Reclamation's efforts to provide a “Second Basis of Comparison” for comparing the environmental consequences of the alternatives, as a response to our concerns about the No Action Alternative. However, the true remedy is to correctly define the No Action Alternative in the first place. That would eliminate the need for a “second basis of comparison,” and simplify the Draft EIS.

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¹ The situation here is unlike most other circumstances where NEPA review is performed, because the CVP and SWP were constructed and operating before NEPA and the ESA were even enacted. Thus, the “no action” alternative, which usually serves as the baseline for evaluating the significance of environmental impacts of action alternatives, is more complicated. The existing Projects, including operations, must be captured in the “no action” baseline so they are not included in the new effects of the action alternatives. For this reason, a hypothetical “no action” alternative that fails to account for current and previous operations of the Projects would be an improper baseline for comparative analysis. See *American Rivers v. Federal Energy Regulatory Comm.*, 187 F.3d 1007 (9th Cir. 1999).

The Draft EIS states:

this EIS includes a “Second Basis of Comparison” that represents a condition in 2030 with coordinated long-term operation of the CVP and SWP without implementation of the 2008 USFWS BO and 2009 NMFS BO RPAs. All of the alternatives are compared to the No Action Alternative and to the Second Basis of Comparison to describe the effects that could occur in 2030 under both bases of comparison.

Because several of the 2009 NMFS BO RPA actions had already been initiated prior to issuance of the 2009 NMFS BO; those actions are included in the Second Basis of Comparison. Reasonably foreseeable actions included in the No Action Alternative that are not related to the 2008 USFWS BO or 2009 NMFS BO are also included in the Second Basis of Comparison.

Draft EIS at ES-8.

We found the description and use of the Second Basis Of Comparison in the Draft EIS somewhat confusing. It is not a remedy for the defects in the No Action Alternative, because it still includes actions based on the BiOps. As we understand it, it does not provide a basis for comparison to CVP and SWP operations consistent with Reclamation’s and DWR’s obligations and all legal requirements *except* requirements related to the ESA.

If Reclamation adopts the Second Basis Of Comparison as its No Action Alternative, it should revise it to eliminate any actions taken in response to the BiOps and RPAs. The Second Basis Of Comparison includes the following “actions included in the 2008 USFWS BO and 2009 NMFS BO”:

- 2008 USFWS BO RPA Component 4, Habitat Restoration.
- 2009 NMFS BO RPA Action I.1.3, Clear Creek Spawning Gravel Augmentation.
- 2009 NMFS BO RPA Action I.1.4, Spring Creek Temperature Control Curtain Replacement.
- 2009 NMFS BO RPA Action I.2.6, Restore Battle Creek for Winter-Run, Spring-Run, and Central Valley Steelhead.
- 2009 NMFS BO RPA Action I.3.1, Operate Red Bluff Diversion Dam with Gates Out.
- 2009 NMFS BO RPA Action I.5, Funding for CVPIA Anadromous Fish Screen Program.
- 2009 NMFS BO RPA Action I.6.1, Restoration of Floodplain Habitat; and Action I.6.2, Near-Term Actions at Liberty Island/Lower Cache Slough and Lower Yolo Bypass; Action I.6.3, Lower Putah Creek Enhancements; Action I.6.4, Improvements to Lisbon Weir; and Action I.7, Reduce Migratory Delays and Loss of Salmon, Steelhead, and Sturgeon at Fremont Weir and Other Structures in the Yolo Bypass.

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- 2009 NMFS BO RPA Action II 1, Lower American River Flow Management.

Draft EIS at 3-5 – 3-7. If the intent of the Second Basis Of Comparison is to provide a basis of comparison “that does not include implementation of the RPAs” then the Second Basis Of Comparison should not include actions under programs that are being implemented in response to, and in lieu of, the RPAs. Draft EIS at 3-22. The purpose of the No Action Alternative is to inform the public and policy makers of what conditions would be like without major ESA-related restrictions on CVP and SWP operations. The existing Second Basis Of Comparison improperly assumes that modifications to CVP and SWP operations are necessary to avoid jeopardy and includes certain existing actions that are dependent on the BiOps’ jeopardy determination.

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In addition, the Second Basis of Comparison does not serve as a substitute for the correct No Action Alternative because the Draft EIS disregards the Second Basis of Comparison throughout much of its NEPA analysis. Critically, the Draft EIS fails to identify mitigation measures that could mitigate the impacts associated with implementing the RPAs, as we explain next.

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E. The Draft EIS Lacks Mitigation Measures For the RPAs

In addition to analyzing the impacts of all potential, feasible alternatives, the EIS must include a discussion of the “means to mitigate adverse environmental impacts.” 40 C.F.R. § 1502.16(h). Accordingly, the EIS must identify all relevant, reasonable mitigation measures that could alleviate a project’s environmental effects, even if they entail actions that are outside the lead or cooperating agencies’ jurisdiction. See “Forty Most Asked Questions Concerning CEQ’s NEPA Regulations,” No. 19b. Such measures must entail feasible, specific actions that could avoid impacts by eliminating certain actions; minimizing impacts by limiting their degree; rectifying impacts by repairing, rehabilitating or restoring the affected environment; reducing impacts through preservation or maintenance; and/or compensating for a project’s impacts by replacing or providing substitute resources. 40 C.F.R. § 1508.20.

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The Draft EIS fails to identify or examine mitigation measures that may help mitigate the impacts of implementing the RPAs. Reclamation’s refusal to even consider ways to mitigate such impacts appears to be tied to its failure to critically examine the RPAs and analyze how the existing RPAs could be modified to mitigate their impacts, such as impacts to SWP and CVP water supplies and deliveries. See *South Fork Band Council of Western Shoshone of Nevada v. U.S. Dept. of Interior*, 588 F.3d 718, 727 (9th Cir. 2009). The EIS fails to provide this critical component of the analysis required by NEPA.

The Draft EIS acknowledges that NEPA requires analysis of mitigation measures, but the Draft EIS fails to identify any measures to mitigate the impacts of implementing the RPAs. The Draft EIS states: “An EIS must also identify relevant, reasonable mitigation measures that are not already included in the proposed action or alternatives to the proposed action that could be used to avoid, minimize, rectify, reduce, eliminate, or compensate for the project’s adverse environmental effects.” Draft EIS at ES-14. However, the EIS then states that “Mitigation measures were not included to address adverse impacts under the alternatives as compared to the Second Basis of Comparison because this analysis was included in this EIS for information purposes only.” *Id.* at ES-14 – ES-15. In other words, the Draft EIS admits there are adverse

impacts associated with implementing the RPAs, but fails to make any effort to identify mitigation measures to address those impacts.

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For example, the Draft EIS confirms that continued implementation of the BiOps' RPAs will cause huge reductions in CVP and SWP water deliveries, yet the Draft EIS makes no effort to identify possible ways to mitigate those impacts. Draft EIS at 5-93 – 5-97 (tables showing reduced water deliveries and text describing reductions). It estimates that on a long-term annual average, the RPAs will reduce CVP water deliveries by 332,000 acre-feet annually, and reduce SWP water deliveries by 773,000 acre-feet annually. *Id.* In particular, implementation of the RPAs is expected to reduce deliveries to CVP South of Delta agricultural water service contractors "by 24 percent over the long-term conditions; 33 percent in dry years; and 37 percent in critical dry years." Draft EIS at 5-95. And deliveries of "Article 21 water to SWP South of Delta water contractors would be reduced by 83 percent over the long-term conditions; 96 percent in dry years; and 92 percent in critical dry years." *Id.* at 5-97. Yet, the Draft EIS fails to identify even a single mitigation measure that could help mitigate these water supply impacts. Failing to identify mitigation for the massive losses of water supply that will indisputably result from implementing the RPAs is inexplicable, and an obvious violation of NEPA.

F. The Draft EIS Fails To Provide A Reasonable Range of Alternatives That Are Responsive To The Purpose And Need For The Action

The alternatives presented and analyzed in the Draft EIS do not represent a reasonable range of alternatives that are responsive to the identified purpose and need for the proposed action. The listed alternatives do not reflect the critical inquiry - how can Reclamation best meet the authorized purposes of the CVP while also ensuring compliance with its obligations under ESA section 7? Further, it fails to consider an alternative that integrates the RPAs from the two BiOps, as a way to avoid or lessen conflicts between prescriptions for the delta smelt and salmonid species.

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1. The Draft EIS Fails To Apply The Purpose And Need In Its Development Of Alternatives

An EIS must contain a statement of "purpose and need" which briefly specifies "the underlying purpose and need to which the [lead] agency is responding in proposing the alternatives including the proposed action." 40 C.F.R. § 1502.13. The purpose and need statement "is a critical element that sets the overall direction of the process and serves as an important screening criterion for determining which alternatives are reasonable." NEPA Handbook at 8-5. This statement of purpose and need is important because it will inform the range of alternatives ultimately selected for analysis in the EIS and "[a]ll reasonable alternatives examined in detail must meet the defined purpose and need." *Id.* The 'need' for the action may be described as the underlying problem or opportunity to which the agency is responding with the action. The 'purpose' may refer to the goal or objective that the bureau is trying to achieve, and should be stated to the extent possible, in terms of desired outcomes." 43 C.F.R. § 46.420(a)(1).

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Statement of Purpose

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The Draft EIS describes the “purpose” of the action as follows:

The purpose of the action considered in this EIS is to continue the operation of the CVP in coordination with operation of the SWP, for its authorized purposes, in a manner that:

- Is similar to historic operational parameters with certain modifications;
- Is consistent with Federal Reclamation law; other Federal laws and regulations; Federal permits and licenses; State of California water rights, permits, and licenses; and
- Enables Reclamation and DWR to satisfy their contractual obligations to the fullest extent possible.

Draft EIS at ES-6.

The Authority, Westlands, and the Exchange Contractors appreciate that the statement of purpose now includes satisfying contractual obligations to the fullest extent possible, and operating the CVP for its authorized purposes. However, implementation of the RPAs has prevented Reclamation from meeting the authorized purposes of the CVP. Reclamation’s inability to meet the CVP’s authorized purposes under the BiOps should be expressly acknowledged, and should inform the development of alternatives.

Statement of Need

The Draft EIS describes the “need” for the action as follows:

Continued operation of the CVP is needed to provide river regulation, navigation; flood control; water supply for irrigation and domestic uses; fish and wildlife mitigation, protection, and restoration; fish and wildlife enhancement; and power generation. The CVP and the SWP facilities are also operated to provide recreation benefits and in accordance with the water rights and water quality requirements adopted by the SWRCB.

The USFWS and NMFS concluded in their 2008 and 2009 BOs, respectively, that the coordinated long-term operation of the CVP and SWP, as described in the 2008 Reclamation Biological Assessment, jeopardized the continued existence of listed species and adversely modified critical habitat. The USFWS and NMFS provided RPAs in their respective BOs as an alternative to the project described in the 2008 BA that would not jeopardize listed species or adversely modify critical habitat.

Draft EIS at ES-6.

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This statement of need does not express the “underlying problem” that Reclamation is responding to. In the context here, providing water supply as fully as possible while still complying with the ESA gives rise to the need for the action. The “underlying problem” that Reclamation is responding to is the difficulty the CVP and SWP have had in serving water supply and other project purposes while complying with the ESA. That requires an analysis of what changes to operations, if any, are necessary to comply with the ESA, and based thereon whether the BiOp prescriptions or some alternative would better meet all project purposes while doing so.

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2. The Range Of Alternatives Does Not Focus On The Key Issues

The alternatives analysis is the “linchpin” of an EIS. *Monroe County Conservation Council, Inc. v. Volpe*, 472 F.2d 693, 697 (2d Cir. 1972). Federal agencies must to the fullest extent possible “[u]se the NEPA process to identify and assess reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment” and to use all practicable means to “avoid or minimize any possible adverse effects of their actions upon the quality of the human environment.” 40 C.F.R. § 1500.2(e), (f). Agencies must “rigorously explore and objectively evaluate all reasonable alternatives.” 40 C.F.R. § 1502.14. Reasonable alternatives are those that are “technically and economically practical or feasible and meet the purpose and need of the proposed action.” 43 C.F.R. § 46.420. Each action alternative should address the purpose of and need for the action . . .” NEPA Handbook at 8-9.

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The Draft EIS’s five alternatives (*see* Draft EIS at 3-31 – 3-42) do not reflect the necessary inquiry into what CVP and SWP modifications, if any, are necessary to satisfy Reclamation’s obligations under ESA section 7. Nor do the alternatives reflect an effort to design alternatives that meet the CVP’s authorized purposes, and avoid, minimize or mitigate impacts to those purposes that may result from modifications to CVP operations. “Alternative 1” is described as “identical to the Second Basis of Comparison.” *Id.* at p. 3-31. “Alternative 2” includes the operational components of the existing BiOps but does not include “RPA actions that would require future studies and environmental documentation to define recommended actions (generally, structural actions).” *Id.* “Alternative 3” includes CVP and SWP operations and ongoing operational management policies of the CVP and SWP that would be similar to the operational assumptions under the Second Basis of Comparison, but with specified changes to water demand assumptions, OMR criteria, and operations of New Melones Reservoir to meet SWRCB D-1641 flow requirements on the San Joaquin River at Vernalis. *Id.* at p. 3-34. “Alternative 3” also includes “Actions Related to Predation Control, Wetlands Restoration, Juvenile Salmonid Trap and Haul Program, and Chinook Salmon Ocean Harvest.” *Id.* at p. 3-37. “Alternative 4” includes ongoing operational management policies of the CVP and SWP that would be identical to operations described under the Second Basis of Comparison. *Id.* at p. 3-39. In addition, “Alternative 4” includes “Actions Related to Floodplain Protection, Levee Vegetation, Predation Control, Wetlands Restoration, Juvenile Salmonid Trap and Haul Program, and Chinook Salmon Ocean Harvest.” *Id.* “Alternative 5” was “developed considering comments from environmental interest groups during the scoping process.” *Id.* at p. 3-41. “Alternative 5” has CVP and SWP operations and ongoing operational management policies of similar to the operational assumptions under the No Action Alternative, with certain specified

changes to water demand assumptions, OMR criteria, and operations of New Melones Reservoir to meet SWRCB D-1641 flow requirements on the San Joaquin River at Vernalis. *Id.*

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The Draft EIS fails to explain whether or how each of the selected alternatives avoid the likelihood of jeopardizing listed species or their critical habitat. Nor does the Draft EIS explain how the selected alternatives meet the purpose of enabling Reclamation and DWR to satisfy their contractual obligations to the fullest extent possible and meet the authorized purposes of the CVP and SWP, respectively. Such an analysis is necessary for both the decisionmakers and the public to evaluate and compare the alternative actions and inform the decision regarding what modifications, if any, to CVP and SWP operations, should be implemented. Unless and until Reclamation critically examines what action alternatives can meet the purpose and need, Reclamation cannot develop feasible alternatives. Mixing and tweaking elements of the RPAs of the existing BiOps, without ever fundamentally reconsidering the RPAs, does not suffice to meet Reclamation's NEPA obligations on remand. Reclamation's failure, to date, to take a "hard look" at what alternative actions could be taken that would meet its ESA obligations and also minimize or avoid impacts to the human environment has resulted in an inadequate range of alternatives in the Draft EIS. The alternatives should allow for adequate water deliveries and prevent significant impacts to public health and the human environment, and also explore various methods to sufficiently maintain and protect the listed species and their critical habitats.

3. In Developing Alternatives, Reclamation Should Consider Integration Of Measures For Delta Smelt And Salmonids

The two BiOps were developed independently of each other in 2008 and 2009, and in some cases, have conflicting RPAs. For example, Delta outflow prescribed for the delta smelt can diminish carryover storage in reservoirs beneficial to temperature management for salmonid species. Expert have suggested that the measures in the two BiOps should be integrated to best account for the needs of all species overall. *See* National Research Council 2010, A Scientific Assessment of Alternatives for Reducing Water Management Effects on Threatened and Endangered Fishes in California's Bay Delta.² In 2011, federal agencies planned an integrated biological opinion. *See* Interim Federal Action Plan Status Update for the California Bay-Delta: 2011 and Beyond, available at <https://www.doi.gov/sites/doi.gov/files/migrated/news/pressreleases/upload/Final-Status-Update-2010-12-15.pdf>. That has not yet happened, however.

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In order to better meet the purpose and need, Reclamation should develop alternatives that reflect a comprehensive and integrated approach to meeting its ESA obligations with respect to both delta smelt and salmonid species, something it and expert scientists have already identified as the appropriate approach. Such an inquiry may reveal that there are ways to maximize overall benefits to protected species while also reducing water supply impacts.

G. The Comparison Of Alternatives Is Inadequate

The Draft EIS's comparison of alternatives runs afoul of NEPA. NEPA requires an EIS to "present the environmental impacts of the proposal and the alternatives in comparative form"

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² References cited are listed below, and will be submitted electronically with these comments.

in a manner that “sharply defin[es] the issues and provid[es] a clear basis for choice among options by the decisionmaker and the public.” 40 C.F.R. § 1502.14. Although the Draft EIS includes two comparison tables that purport to identify the differences between the alternatives, the No Action Alternative, and the Second Basis of Comparison, neither the tables nor the resource chapters of the Draft EIS provide a clear basis for choice among the options.

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Because the proposed modifications of CVP and SWP operations are required under the ESA only if they are necessary to avoid jeopardy and destruction or adverse modification of critical habitat (*see* Draft EIS at ES-5), it is essential that for each alternative the EIS analyze and describe the estimated attributable increase or decrease in: (1) the numbers of individuals of each species, (2) the estimated population viability of the listed species, and (3) the amount or quality of their critical habitats under each alternative. This type of quantitative analysis would enable numerical comparisons of the type preferred in Reclamation’s NEPA Handbook. *See* NEPA Handbook at 8-13. If Reclamation concludes there is no way to reliably compute such differences among the expected outcomes of each of the alternatives, the EIS should reveal and explain that lack of pertinent information. The Draft EIS lacks any of this information and explanation, and hence is not in compliance with the NEPA requirement to “[d]evote substantial treatment to each alternative considered in detail . . . so that reviewers may evaluate their comparative merits.” 40 C.F.R. § 1502.14(b); *see also* NEPA Handbook at 8-8.

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While the two comparison tables included in the Draft EIS’s Executive Summary chapter provide quantitative information regarding the reduction in surface water resources and water supplies,³ for example, the information regarding fish and aquatic resources is wholly qualitative, and does not allow for an easy comparison of the relative merits of the various alternatives analyzed, or the trade-offs involved in choosing one alternative over another. The following entries from Table ES.2, Comparison of No Action Alternative and Alternatives 1 through 5 to the Second Basis of Comparison, demonstrate the problem. Regarding the effects of the No Action Alternative, Alternative 3, and Alternative 5 on the delta smelt, as compared to the Second Basis of Comparison, the Draft EIS states:

- No Action Alternative: “Overall, likely would result in better conditions for Delta Smelt, primarily due to lower percentage entrainment for larval and juvenile life stages, and more favorable location of Fall X2 in wetter years, and on average.” Draft EIS at ES-60.
- Alternative 3: “Overall, effects would be similar based on reduced entrainment and more favorable location of Fall X2.” *Id.* at ES-64.
- Alternative 5: “Overall, likely would result in better conditions for Delta Smelt, primarily due to lower percentage entrainment for larval and juvenile life stages,

³ For example, Table ES.2 indicates that the No Action Alternative would result in reduced storage in San Luis Reservoir in October through February, April, and May of wet years, up to 57.2%, as compared to the Second Basis of Comparison. Draft EIS at ES-48; *see also* Draft EIS at 22-36 (Table 22.2). In contrast, Alternative 3 would result in reduced storage in San Luis Reservoir in December through February and June of wet years, up to 15.7%, as compared to the Second Basis of Comparison (*id.* at ES-51), and Alternative 5 would result in reduced storage in San Luis Reservoir in October through February and April through August of wet years, up to 9.9% (*id.* at ES-55).

and more favorable location of Fall X2 in wetter years, and on average.” *Id.* at ES-69.

These statements suggest that each of the three alternatives would result in similar or “better” conditions for delta smelt, but they do not identify how much “better” for delta smelt each alternative might be. The missing information is necessary to enable decisionmakers to evaluate the alternatives in light of the trade-offs involved in choosing one alternative over another. Table ES.2 indicates that the No Action Alternative results in significantly reduced storage in San Luis Reservoir in wet years as compared to Alternative 5 (Draft EIS at ES-48, ES-55), but the table indicates that both the No Action Alternative and Alternative 5 “likely would result in better conditions for Delta Smelt” (*id.* at ES-60, ES-69). As a modifier in this context, “better” is useless. How much better than the Second Basis of Comparison would the alternatives be for delta smelt? To a significant degree? Are the “better conditions” necessary to avoid jeopardizing the delta smelt or adversely modifying its critical habitats? Is the science too uncertain to be able to say? Is there a difference in the improvement between the No Action Alternative and Alternative 5? What is the water supply cost for these “better” conditions? The answers to these questions must be apparent in any comparison table in the final EIS.

The discussion in each of the various resource chapters of the Draft EIS does not enable a meaningful comparison of the alternatives either. For example, the following statements from Chapter 9 are provided in the discussion of the No Action Alternative and Alternatives 1 through 5 relative to the Second Basis of Comparison, regarding the effects on the Sacramento River Winter-Run Chinook Salmon:

- No Action Alternative: “These model results suggest that effects on winter-run Chinook Salmon would be similar under both scenarios [under the No Action Alternative and the Second Basis of Comparison], with a small likelihood that winter-run Chinook Salmon escapement would be higher under the No Action Alternative. This potential distinction between the two scenarios, however, may be offset by the benefits of implementation of fish passage under the No Action Alternative intended to address the limited availability of suitable habitat for winter-run Chinook Salmon in the Sacramento River reaches downstream of Keswick Dam. This potential beneficial effect and its magnitude would depend on the success of the fish passage program.” Draft EIS at 9-164.
- Alternative 3: “These model results suggest that effects on winter-run Chinook Salmon would be similar under both scenarios, with a small likelihood that winter-run Chinook Salmon escapement would be higher under Alternative 3 than under the Second Basis of Comparison. The ocean harvest restrictions under Alternative 3 could provide additional benefit, although the effects of the predator management program are uncertain.” *Id.* at 9-325.
- Alternative 5: “The analysis of temperatures indicates somewhat higher temperatures and greater likelihood of exceedance of thresholds under Alternative 5 as compared to the Second Basis of Comparison. This is reflected in the slightly lower survival of winter-run Chinook Salmon eggs predicted by Reclamation’s salmon mortality model. Flow changes under Alternative 5 would

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have small effects on the availability of spawning and rearing habitat for winter-run Chinook Salmon as indicated by the decrease in flow (habitat)-related mortality predicted by SALMOD under Alternative 5. Through Delta survival of juvenile winter-run Chinook Salmon would be the same under both Alternative 5 and Second Basis of Comparison as indicated by the DPM results; and the OBAN results suggest that Delta survival could be higher under Alternative 5. Entrainment may also be reduced under Alternative 5 as indicated by the OMR flow analysis. Median adult escapement to the Sacramento River would be reduced slightly under Alternative 5 as indicated by the IOS model results which incorporate temperature, flow, and mortality effects on each life stage over the entire life cycle of winter-run Chinook Salmon. However, the OBAN model results indicate an increase in escapement over a more limited time period (1971 to 2002). Considering all the above analyses for the winter-run Chinook Salmon population, the changes in overall effects under Alternative 5 compared to Second Basis of Comparison are highly uncertain. However, the upstream fish passage included under Alternative 5 could benefit the winter-run Chinook Salmon population in the Sacramento River as compared to the Second Basis of Comparison if successful.” *Id.* at 9-359.

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These descriptions do not indicate the materiality of the projected differences for the populations of affected fish species. Are the differences in projected conditions material? What criteria will be used to determine whether a particular difference is material? Is one alternative better suited than another in terms of avoiding jeopardy and destruction or adverse modification of critical habitat? As with Tables ES.1 and ES.2, the descriptions in the Draft EIS’s resource chapters do not enable decisionmakers or the public to understand the differences between Alternatives 1-5, the No Action Alternative, and the Second Basis of Comparison. More information is needed. If the expected relative benefit of a particular operation intended to protect fish populations is minimal, that information would usefully inform Reclamation’s ultimate decision on whether to adopt that measure, especially if that measure significantly impairs other project purposes. If the materiality of the differences in conditions is unknown, that absence of information should be expressly noted. A synthesis and presentation of information regarding the materiality of potential changes in operations for fish populations, or the lack of such information, would help inform the public and decision makers of the expected benefits or detriments of alternative operations.

Tables ES.1 and ES.2 and the resource chapters in the Draft EIS should be revised to provide a more meaningful comparison among all the alternatives. Dually providing analytic information in both text and tabular or other graphic formats will best provide full and understandable disclosure to the public and decision-makers of the relative merits of each action alternative and the No Action Alternative, and better inform and support any policy decisions Reclamation makes at the end of the NEPA processes. Without revision, the comparison of alternatives in the Draft EIS will violate NEPA’s requirement to “present complete and accurate information to decision makers and the public to allow an informed comparison of the alternatives considered in the EIS.” *Nat. Resources Def. Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005).

H. The “Snapshot” Look At The Year 2030 For The Effects Analyses Is Not Adequately Explained And Masks Aggregate Impacts

The Draft EIS states that it “analyzes future conditions projected for the Year 2030,” and a “range of alternatives” for coordinated operations “in the Year 2030.” Draft EIS at ES-7, 3-1 and 4-1. The stated justification for looking to that single year is that “the coordinated long-term operation of the CVP and SWP, as described in the alternatives analyzed in this EIS, would continue to at least 2030 before major changes to CVP and SWP operations would be implemented.” Draft EIS at ES-7.

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This does not explain why the analysis excludes consideration of the years from 2015 to 2029. Looking only to a single year fifteen years from today, in 2030, omits consideration of impacts in the interim period. For example, if the existing reasonable and prudent alternatives continue in operation each year until 2030, they will likely result in water supply impacts in each of those years. The nature of the impacts may change over that period, as other operations and conditions change. If Reclamation has concluded that conditions, operations and impacts in 2030 will typify all the intervening years, it has not explained and justified that conclusion. Another problem with limiting analysis to 2030 is it fails to consider fifteen years of impacts in the aggregate. The impacts to farms and communities and resources from one year of lost CVP water supply in 2030 is not the same as the accumulated impact of 15 years of lost CVP water supply. Finally, impacts of actions taken between now and 2030 may continue to be felt after 2030. For example, the Draft EIS projects increased use of groundwater to compensate for lost surface supplies. That will create a deficit in groundwater supplies that will have impacts well past 2030.

I. The Draft EIS Fails To Acknowledge Or Incorporate The Lessons From Operating The Projects Under The BiOps The Past Seven Years

For this NEPA review, Reclamation is not in a situation where it must rely entirely on projections and modeling to forecast what might happen with implementation of the RPAs. Reclamation has the unusual advantage of knowing the actual, observed consequences of implementing the BiOps over the past seven years. That information is highly useful in projecting what would likely occur with implementation of the RPAs between now and 2030. Unfortunately, the Draft EIS fails to take advantage of that experience. Instead its analysis largely ignores and indeed contradicts the realized effects of implementing the BiOps.

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As detailed below, the Draft EIS relies heavily on modeling and assumptions without “tuning up” those models and assumptions with what has actually occurred as a result of operating the CVP and SWP to meet the RPAs since 2008. For example, it assumes that groundwater will fully substitute for lost CVP and SWP supplies. But in fact, that is not what has happened since 2008. Instead, shortages of surface water supply have resulted in extensive fallowing of farm land, demonstrating that groundwater in fact cannot fully replace lost surface water supply. Further, in the years since the RPAs were adopted, the delta smelt and salmonid species have further declined, not recovered. That experience should inform any assessment of the supposed benefit of and necessity for the RPA prescriptions, and the impact of CVP and SWP operations relative to other stressors. Yet, as described above, the Draft EIS fails to critically examine the conclusions in the BiOps and RPAs at all.

J. The Draft EIS Fails To Disclose The Limits Of Scientific Knowledge And The Policy-Based Decision Facing Reclamation

The Draft EIS is deficient because it lacks an analysis and explanation of the substantial scientific uncertainties underlying the conclusions and prescriptions in the BiOps. When Reclamation is “evaluating the reasonably foreseeable significant adverse effects on the human environment in [the EIS] and there is incomplete or unavailable information,” it is required to “always make clear that such information is lacking.” 40 C.F.R. § 1502.22. The comments submitted by the State Water Contractors extensively document such uncertainties, and the scientific information not addressed in the Draft EIS. As the State Water Contractors note, the Draft EIS neglects to identify relevant data and studies that contradict some of its premises, and it treats mere hypotheses as accepted truths.

The available science falls well short of dictating any particular decision or specific requirement, e.g. a particular limit on negative OMR flows for delta smelt, as essential to the continued survival of the species. For example, as a National Research Council report explained about the OMR requirement for delta smelt:

there is substantial uncertainty regarding the amount of flow that should trigger a reduction in exports. In other words, the specific choice of the negative flow threshold for initiating the RPA is less clearly supported by scientific analyses. The biological benefits and the water requirements of this action are likely to be sensitive to the precise values of trigger and threshold values. There clearly is a relationship between negative OMR flows and mortality of smelt at the pumps, but the data do not permit a confident identification of the threshold values to use in the action, and they do not permit a confident assessment of the benefits to the population of the action. As a result, the implementation of this action needs to be accompanied by careful monitoring, adaptive management, and additional analyses that permit regular review and adjustment of strategies as knowledge improves.⁴

The Draft EIS should be revised to acknowledge and define this and similar gaps in knowledge for decision makers, and the public. Even with the benefit of the most recent data available, Reclamation’s coming decisions will be predominantly policy choices made in the context of significant scientific uncertainty.

Part of the value of the NEPA process is its requirement to disclose and discuss the relevance of conflicting, inconsistent data and unavailable or incomplete data. Past regulatory decisions taken without the guiding light of NEPA have been made with an unjustified claim of certainty or necessity without acknowledgment of the significant uncertainty or imprecision that accompanied such actions. This obscures the true weight of the policy decisions set before the agency, and discourages honest and critical evaluation of policy options.

⁴ National Research Council (2012). Sustainable Water and Environmental Management in the California Bay-Delta. Washington DC: National Academies Press, at pp. 210-211.

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In 2004, the National Research Council issued a report addressing the degree of scientific certainty, or lack thereof, regarding measures imposed under the ESA for the protection of listed fishes in the Klamath River basin. National Research Council, *Endangered and Threatened Fishes in the Klamath River Basin: Causes of Decline and Strategies for Recovery*. Washington, DC: The National Academies Press, 2004. To accomplish their charge, the committee developed “specific conventions for judging the degree of scientific support for a proposal or hypothesis” in the Klamath biological opinions. *Id.* at p. 35. The committee summarized these conventions in the following table:

TABLE 1-2 Categories Used by the Committee for Judging the Degree of Scientific Support for Proposed Actions Pursuant to the Goals of the ESA

Basis of Proposed Action	Scientific Support	Possibly Correct?	Potential to be Incorrect
Intuition, unsupported assertion	None	Yes	High
Professional judgment inconsistent with evidence	None	Unlikely	High
Professional judgment with evidence absent	Weak	Yes	Moderately high
Professional judgment with some supporting evidence	Moderate	Yes	Moderate
Hypothesis tested by one line of evidence	Moderately strong	Yes	Moderately low
Hypothesis tested by more than one line of evidence	Strong	Yes	Low

These or similar criteria should be explicitly applied in the NEPA process here to assess the strength of any scientific justification for the reasonable and prudent alternatives in the existing BiOps, and any other proposed restrictions on CVP and SWP operations that are intended to benefit listed species. Doing so will assist decisionmakers and the public in better understanding the choices to be made among alternatives.

Some have sought to justify restrictions on CVP and SWP operations even in the absence of substantial scientific support, based on the “precautionary principle.” As the Klamath report observed, however, “even when a policy decision is made to apply the precautionary principle, the question of whether the decision is consistent with the available scientific information is important. . . . At some point [] erring on the side of protection in decision-making ceases to be precautionary and becomes arbitrary. One indication that policy-based precaution has given way to bias or political forces is a major inconsistency of a presumed precautionary action with the available scientific information.” *Id.* at 315. If Reclamation makes a policy decision to apply the precautionary principle here, that choice should be explicit, so that choice and the tradeoffs involved are made clear to the public and any reviewing courts. That policy choice has not been made explicit in past decisions. In the litigation regarding the 2009 Salmonid BiOp, for example, NMFS sought to justify a restriction on OMR flows based on precaution, but as the district court found “nowhere in the BiOp (or any other document in the administrative record

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cited by the parties) [did] NMFS disclose its intent to use a 'precautionary principle' to design the RPA Actions." *Consolidated Salmonid Cases*, 713 F. Supp. 2d 1116, 1145 (E.D. Cal. 2010).

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The Draft EIS does a poor job of describing the full extent of available scientific data, and disclosing the scientific uncertainty underlying the necessity for and efficacy of the existing reasonable and prudent alternatives. The Draft EIS fails to disclose or acknowledge that there is significant uncertainty regarding the effects of CVP and SWP operations on ESA-listed species, and regarding the potential benefits of modifications to operations, such as those identified in the existing RPAs. Current science does not, and cannot, dictate the precise modifications to CVP and SWP operations, if any, that are necessary to avoid jeopardizing listed species. Rather, there is a range of alternative actions that Reclamation could take that would comply with its legal obligations, including its obligations under under ESA section 7, given the available scientific data. Selecting an action within that range is essentially a policy decision, not a decision ultimately dictated by science.

In sum, the NEPA review here should make clear the differences between what is known based on the best available science, and where the appropriate decision makers must make policy judgments in the face of uncertainty. Reclamation should be explicit in identifying the scientific uncertainty associated with any restrictions on CVP and SWP operations that are proposed as necessary to comply with the ESA, and acknowledge that it is essentially making a policy decision. Reclamation's policy decision should be informed by a multitude of considerations, including avoiding water supply impacts to its CVP contractors.

II. THE ANALYSIS OF IMPACTS RELATING TO WATER RESOURCES AND AQUATIC SPECIES SUFFERS FROM ADDITIONAL DEFECTS

An EIS's discussion of environmental consequences "forms the scientific and analytical basis" for comparing the environmental impacts of the proposed action and the alternatives. 40 C.F.R. § 1502.16. One of the purposes of NEPA is to ensure that "environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality." 40 C.F.R. § 1500.1(b). An EIS must provide "full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 C.F.R. § 1502.1. NEPA requires that all federal agencies, to the fullest extent possible, "utilize a systematic, interdisciplinary approach which will insure the integrated use of natural and social sciences" and "initiate and utilize ecological information in the planning and development of resource-oriented projects." 42 U.S.C. § 4334(2)(A), (H).

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A. The Draft EIS Makes Unreasonable And Unsupported Assumptions Regarding Water Supplies And Associated Environmental Impacts

1. The EIS Unreasonably Assumes That Increased Groundwater Use Will Fully Compensate For Lost Surface Water Supplies

The Draft EIS makes several unreasonable and unsupported assumptions regarding water supplies that skew the environmental effects analyses and cause environmental impacts to be

masked or understated. First, the Draft EIS unreasonably assumes that future water demands will be met in dry and critical dry years. The Draft EIS states:

Under the No Action Alternative and Second Basis of Comparison, it is assumed that water demands would be met on a long-term basis and in dry and critical dry years using a combination of conservation, CVP and SWP water supplies, other imported water supplies, groundwater, recycled water, infrastructure improvements, desalination water treatment, and water transfers and exchanges. It is anticipated that individual communities or users could be in a situation that would not allow for affordable water supply options, and that water demands could not be fully met. However, on a regional scale, it is anticipated that water demands would be met.

Draft EIS at 5-67. This assumption is unreasonable and unsupported because it is grounded in several other unreasonable assumptions, particularly regarding the availability of groundwater, as discussed below.

Second, the Draft EIS unreasonably assumes that groundwater will not just continue to be available at current levels, but that groundwater use can be increased from current levels, despite recent landmark legislation that will significantly regulate groundwater use. *See e.g.*, Draft EIS at 19-48 (describing assumed “increase in groundwater pumping of approximately 6 percent” in Sacramento Valley and San Joaquin Valley). The Draft EIS states: “The No Action Alternative and the Second Basis of Comparison assume that groundwater would continue to be used even if groundwater overdraft conditions continue or become worse.” Draft EIS at 5-68. The Draft EIS only briefly acknowledges the California law regulating groundwater use, and then proceeds to ignore the implications of the new law on the availability of groundwater to meet future water demands. The Draft EIS states, in relevant part:

It is recognized that in September 2014 the Sustainable Groundwater Management Act (SGMA) was enacted. The SGMA provides for the establishment of a Groundwater Sustainability Agencies (GSAs) to prepare Groundwater Sustainability Plans (GSPs) that will include best management practices for sustainable groundwater management.

...

The SGMA requires the formation of GSPs in groundwater basins or subbasins that DWR designates as medium or high priority based upon groundwater conditions identified using the CAGESM results by 2022. Sustainable groundwater operations must be achieved within 20 years following completion of the GSPs. In some areas with adjudicated groundwater basins, sustainable groundwater management could be achieved and/or maintained by 2030. However, to achieve sustainable conditions in many areas,

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measures could require several years to design and construct water supply facilities to replace groundwater, such as seawater desalination. Therefore, it does not appear to be reasonable and foreseeable that sustainable groundwater management would be achieved by 2030; and it is assumed that groundwater pumping will continue to be used to meet water demands not fulfilled with surface water supplies or other alternative water supplies in 2030.

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Draft EIS at 5-68 – 5-69; *see id.* at 7-109 (“this EIS analysis assumes that the new facilities or conservation measures are not implemented by 2030. Therefore, reductions in groundwater use in accordance with the SGMA are not anticipated until after 2030”)

The assumption that groundwater use will increase in 2030, despite SGMA, is unreasonable and unsupported. For starters, SGMA requires that groundwater basins in critical overdraft begin being managed under groundwater sustainability plans starting in 2020. Cal. Wat. Code, § 10720.7(a)(1). The Draft EIS’s presumption that groundwater availability will not be affected in 2030, after ten years of implementing a sustainability plan for a basin in critical overdraft, is untenable. Likewise, the Draft EIS’s presumption that regulating agencies in other basins will do nothing in the first eight years that they are supposed to be moving towards sustainable use of groundwater is baseless. *See* Cal. Wat. Code, § 10720.7(a)(2) (requiring submittal of groundwater sustainability plans for other basins by 2022). The Draft EIS itself admits that “in some basins and subbasins, SGMA actions could be implemented early, and sustainable groundwater management might be fully underway by 2030.” Draft EIS at 7-142. Yet, the Draft EIS presumes that SGMA implementation will not affect the volume of groundwater available for use in 2030. The Draft EIS fails to acknowledge that SGMA requires annual reporting regarding water use to DWR and also requires DWR to assess each basin’s progress in achieving sustainability, at least every five years after a sustainability plan is submitted. Cal. Wat. Code, § 10733.8. This means that the Draft EIS’s assumption that the status quo for groundwater use will be maintained up to and including 2030 is incorrect, because managing agencies will be required to demonstrate progress towards sustainability (e.g. using less groundwater) by 2025 or 2027. Further, the Draft EIS does not recognize that in some cases sustainability may be achieved through reductions in water demands (e.g. fallowing of agricultural lands), and that these reductions do not require new “water supply facilities” to be in place before reductions are mandated. *See* Draft EIS at 5-68 – 5-69.

The Draft EIS fails to account for the fact that many of the groundwater basins that would be affected by reduced surface water supplies from the CVP and SWP are basins that have been identified as being in critical overdraft. The Draft EIS admits that “[d]ue to the low amounts of average annual precipitation, limited surface water supply and extensive agricultural water use, there are areas of significant overdraft that exist in the San Joaquin Valley Groundwater Basin. Eight subbasins in the San Joaquin Valley Groundwater Basin were identified in a state of critical overdraft: Chowchilla, Eastern San Joaquin, Madera, Kings, Kaweah, Tule, Tulare Lake, and Kern (DWR 1980).” Draft EIS at 7-28. But the Draft EIS fails to explain how it is reasonable to assume that groundwater use will increase in basins that are already in critical overdraft, and which will need to be managed for sustainability starting in 2020. Cal. Wat. Code, § 10720.7(a)(1). How can the Draft EIS assume that in 2030, these basins will be able to sustain increased use of groundwater to make up for lost CVP and SWP surface water supplies?

In fact, the Draft EIS elsewhere contradicts its own unreasonable assumption regarding SGMA and future groundwater use. In the discussion of cumulative effects on groundwater resources, the Draft EIS concedes that SGMA is expected to result in reduced groundwater use. It states:

Implementation of SGMA, will have a beneficial effect on groundwater resources, as most areas will develop plans to manage groundwater extractions to not exacerbate further groundwater level declines. The implementation of the SGMA in high and medium groundwater basins would reduce the impacts on groundwater levels, storage and groundwater supply by implementing sustainable groundwater management plans and actions at the local level.

Draft EIS at 7-142. The Draft EIS's expectation that implementation of SGMA will alleviate groundwater level declines is premised on SGMA resulting in reduced groundwater use. Yet, the Draft EIS's analysis assumes *increased* groundwater use in 2030.

Third, the Draft EIS assumes groundwater use can increase in the future, despite existing conditions indicating limitations on the availability and utility of groundwater. For example, the EIS acknowledges that "there are several locations [within the Sacramento Groundwater Basin] showing early signs of persistent drawdown, suggesting limitations due to increased groundwater use in dry years. Locations of persistent drawdown include: Glenn County, areas near Chico in Butte County, northern Sacramento County, and portions of Yolo County." Draft EIS at 7-14. The Draft EIS states that the "persistent areas of drawdown [in the Sacramento Groundwater Basin] could be early signs that the limits of sustainable groundwater use have been reached in these areas." Draft EIS at 7-15. Yet, the Draft EIS fails to reconcile its assumption of increased groundwater use in the future, with the existing conditions indicating that certain groundwater basins may not be able to sustain even the current levels of groundwater use.

Several recent reports provide evidence that is it unreasonable for the Draft EIS to assume that groundwater can make up the difference between future water demands and shortages in surface water supplies. In recent years the lack of surface water supply has resulted land fallowing, something that would not occur if groundwater could simply be substituted for lost surface supplies. As DWR recently reported, the experience in water years 2014 and 2015, in which CVP south-of-Delta agricultural contractors received zero CVP water supplies, was large-scale land fallowing and lost agricultural employment. As DWR observed: "[a]lthough groundwater and water transfers may make up for some of the lost surface water supplies, cuts of this magnitude [like those of 2014 and 2015] result in abandonment of permanent plantings such as orchards and vineyards, large-scale land fallowing, and job losses in rural communities dependent on agricultural employment." DWR, 2015 Drought Brochure, at 11.⁵ DWR estimated that almost 700,000 acres of land were fallowed in 2014, as a result of the water shortages experienced that year. DWR, 2014 Public Update for Drought Response, at 34.⁶ The

⁵ Available at http://www.water.ca.gov/waterconditions/docs/DWR_DroughtBroch_070815-web.pdf

⁶ Available at http://www.water.ca.gov/waterconditions/docs/DWR_PublicUpdateforDroughtResponse_GroundwaterBasins.pdf at

extent of land fallowing during the recent drought shows that during times of surface water shortages, such as the shortages that would occur under the RPAs, groundwater does not serve as a complete substitute.

In addition, the existing problems with land subsidence provide evidence that there are significant and irreversible consequences of relying on groundwater to make up for surface water shortages. For example, a NASA report from August of 2015 shows that areas of the Central Valley have suffered extreme land subsidence during the recent drought. During the period of May 2014-January 2015, NASA observed that certain areas of the Central Valley subsided by over 13 inches. NASA, Progress Report, at 1.⁷ This land subsidence is, or threatens to, impact major infrastructure, including the California Aqueduct and Mendota Canal, which provide critical conveyance of surface water supplies throughout California. *See id.* (subsidence of approximately 14 inches observed within a half a mile of the California Aqueduct). The NASA report shows how subsidence rates can accelerate with increasing reliance on groundwater. For example, the report states that during the period of July 2013 through March 2015, a subsidence bowl near the California aqueduct “impacted the aqueduct significantly,” causing 8 inches of subsidence along a 1.3 mile stretch of the aqueduct. *Id.* at 14-15.

The Draft EIS’s unreasonable assumption regarding future groundwater use is a significant error for several reasons. For one, the EIS assumes that groundwater will effectively make up the difference between future water demands and other water supplies. Draft EIS at 5-68 – 5-69. In addition, the EIS presumes that groundwater will provide over one-third of the total future water supplies. *See id.* at 5-68, Table 5.10 (identifying groundwater as providing 2,644,047 acre-feet of the total 7,798,561 acre-feet future water demand). Most importantly, the unreasonable assumption regarding future groundwater supplies permeates the analyses of environmental effects and causes environmental effects in multiple resource categories to be understated.

2. The Draft EIS’s Unreasonable Assumptions Regarding Water Supplies Skew The Analyses Of Other Resource Categories

(a) Impacts To Agricultural Resources Are Underestimated

The Draft EIS’s unreasonable assumptions regarding future use of groundwater skew the analyses of impacts to other resource categories. For example, the analysis of impacts to agricultural resources assumes that groundwater use in 2030 will increase, in response to reductions in the availability of CVP and SWP water supplies. “The analysis does not restrict groundwater withdrawals based upon groundwater overdraft or groundwater quality conditions.” Draft EIS at 12-24. While the Draft EIS acknowledges that “the Sustainable Groundwater Management Act requires preparation of Groundwater Sustainability Plans (GSPs) by 2020 or 2022 for most of the groundwater basins in the Central Valley Region,” the EIS still assumes that “Central Valley agriculture water users would not reduce groundwater use by 2030, and that groundwater use would change in response to changes CVP and SWP water supplies.” *Id.* The presumption that agriculture water users would be able to *increase* groundwater use as needed to support existing cropping levels, despite being subject to stricter regulation of groundwater use is

⁷ Available at http://www.water.ca.gov/groundwater/docs/NASA_REPORT.pdf

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unreasonable, and disguises the potential for land fallowing and other impacts to agricultural production. Due to this unreasonable assumption, the Draft EIS concludes that implementation of the RPAs will not measurably reduce agricultural production. For example, the Draft EIS concludes that “Agricultural production in the Sacramento Valley would be similar (less than 5 percent change) under the No Action Alternative and the Second Basis of Comparison over long-term average conditions and in dry and critical dry years due to increased use of groundwater . . .” Draft EIS at 12-28. The Draft EIS reaches the same flawed conclusion with respect to agricultural production in the San Joaquin Valley. *See id.* at p. 12-30.

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The Draft EIS’s conclusions regarding no significant impacts to agricultural production are also contradicted by substantial evidence indicating that lands will be fallowed in response to reductions in surface water supplies from the CVP and SWP. In Westlands Water District, for example, land fallowing has significantly increased during the last two years of zero percent CVP contract allocations to Westlands. See Exhibit C, Westlands Water District Water Supply Graph, attached. In 2014, farmers within Westlands fallowed over 200,000 acres and farmers are expected to fallow a similar amount of acreage in 2015, due to the lack of CVP surface water supplies. The Draft EIS itself acknowledges that “[i]n extreme dry periods, such as 2014 when there were no deliveries of CVP water to San Joaquin Valley water supply agencies with CVP water service contracts, permanent crops were removed because the plants would not survive the stress of no water or saline groundwater (Fresno Bee 2014).” Draft EIS at 12-10. Yet, the Draft EIS does not appear to apply these observed facts to its analysis of how agricultural resources will be impacted by reduced CVP and SWP deliveries in the future. And despite the recognition that farmers have fallowed crops because saline groundwater is not suitable for certain crops, the Draft EIS does not consider groundwater quality as a factor in evaluating the ability to increase groundwater use for agricultural production. *See* Draft EIS at 12-24 (“The analysis does not restrict groundwater withdrawals based upon groundwater overdraft or groundwater quality conditions.”). The observed trends in land fallowing in response to reductions in surface water supplies need to be incorporated into the EIS’s analysis of expected impacts to agricultural production.

(b) Socioeconomic Impacts Are Underestimated

The Draft EIS’s unreasonable assumption about groundwater use, and resulting conclusions regarding effects on agriculture, skew the analysis of socioeconomic impacts. The assessment of socioeconomic impacts to agriculture-dependent communities in the Central Valley region is grounded in the faulty assumption that “the impact to irrigated acreage and agricultural production is relatively small” and that “[m]ost of the change in CVP or SWP irrigation supplies would be offset by changes in groundwater pumping, with only small changes in crop acreage in production.” Draft EIS at 19-39. In turn, the Draft EIS’s estimates of socioeconomic impacts associated with reduced agricultural production are gross underestimates. For example, the Draft EIS states:

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The agricultural production value under long-term average conditions would be reduced by less than 1 percent (\$1.6 million/year in the Sacramento Valley and \$0.5 million/year in the San Joaquin Valley) primarily due to an increase in groundwater pumping of approximately 6 percent. The agricultural production

value under dry and critical dry conditions also would be reduced by less than 1 percent (\$11.3 million/year in the Sacramento Valley and \$20.3 million/year in the San Joaquin Valley) primarily due to an increase in groundwater pumping.

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Draft EIS at 19-48. If reasonable assumptions were made regarding groundwater use and agriculture production, the estimated socioeconomic impacts of implementing the RPAs would be significantly greater.

The Draft EIS significantly underestimates the socioeconomic impacts of reduced CVP and SWP water supplies. For example, the Draft EIS concludes that implementation of the RPAs will only result in the loss of 254 agricultural-related jobs in the San Joaquin Valley in dry or critically dry years. See Draft EIS at 19-49, Table 19-61. Yet, existing literature provides evidence that past reductions in CVP and SWP water deliveries have resulted in significantly more lost jobs than the Draft EIS estimates. For example, several economic reports have estimated the number of jobs lost as a result of reductions in CVP and SWP water deliveries in 2009, and one of the most recent reports estimates that 9,100 agricultural-related jobs were lost in the San Joaquin Valley as a result of the 2009 water supply reductions.⁸ The report also found that the lost jobs corresponded to land fallowing that occurred in response to reductions in CVP and SWP water deliveries, and estimated that “the 2009 water supply reductions reduced harvested acreage in the San Joaquin Valley by 240,000 acres . . .” *Id.* This report indicates that reductions in CVP and SWP water deliveries would be expected to result in significant losses in agricultural-related jobs, and contradict the Draft EIS’s conclusion that similar job losses will not occur in the future in response to reductions in water deliveries. The Draft EIS must look at empirical data and existing literature to inform its conclusions regarding impacts to agriculture and agricultural-related jobs.

The actual impacts to agriculture-dependent communities from reduced CVP and SWP water supplies are not revealed in the Draft EIS, but the importance of agriculture to the Central Valley economy is clear. The Draft EIS fails to identify the percent of the total workforce within the Central Valley region that depend on agriculture for employment, but the Draft EIS does show that over half of the state’s farm employment is in the Central Valley region. See Draft EIS at 19-9, Table 19.10. The Draft EIS also acknowledges that “farming is one of the most important basic industries in the Central Valley; and supports many other businesses including farm inputs (e.g., fertilizer, seed, machinery, and fuel) and processing of food and fiber grown on farms. As a result, employment both directly on farm and indirectly dependent on farming is higher than the values” reported in the Draft EIS for “farm employment.” *Id.* at p. 19-14. For example, as the Draft EIS acknowledges, a “study of the local economy in four counties of the San Joaquin Valley found that, for every on-farm job, about two and one-half additional jobs are supported because of inputs purchased for farming operations (NEA 1997).” *Id.* at p. 19-14. This means that there are cascading socioeconomic impacts that result from decreased agriculture productivity. The central role of agriculture in Central Valley communities makes it

⁸ Auffhammer, M., Foreman, K., and Sunding, D. (2014) Turning Water Into Jobs: The Impact of Surface Water Deliveries on Farm Employment and Fallowing in California’s San Joaquin Valley, *Submitted for publication*, at p. 4.

even more critical that Reclamation include reasonable assumptions regarding water supplies, and regarding the corresponding impacts on agriculture of reduced water supplies.

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(c) Environmental Justice Impacts Are Underestimated

Due to the Draft EIS's unreasonable assumptions about groundwater use and in turn, agriculture and agriculture-dependent communities, the Draft EIS provides no analysis of the environmental justice impacts that result from reduced CVP and SWP water supplies. Despite the Draft EIS's acknowledgment that communities throughout the Central Valley, and particularly the San Joaquin Valley, are areas with higher concentrations of minority populations and/or populations below the poverty level, the issue of environmental justice is left unexamined in the Draft EIS. The Draft EIS states the reason for this omission is that changes in employment related to irrigated agriculture and M&I water supplies would be similar under the RPAs and compared to the Second Basis of Comparison, and therefore, "these changes are not analyzed in this EIS." Draft EIS at 21-46. However, as explained above, the Draft EIS's assumption that groundwater can provide a substitute for reduced CVP and SWP water supplies due to implementation of the RPAs is unreasonable and contrary to observed conditions in the San Joaquin Valley. Reduced CVP and SWP water supplies have, and will continue to have, a significant impact on the agricultural communities throughout the Central Valley, and will cause environmental justice impacts on communities that are already suffering.

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The Draft EIS acknowledges that many of the areas that would be impacted by reduced water deliveries from the CVP and SWP, such as the San Joaquin Valley, are areas with higher concentrations of minority populations and/or populations below the poverty level. For example, the Draft EIS recognizes that portions of the San Joaquin Valley are considered "poverty areas": "Merced, Fresno, Tulare, and Kern counties are defined as poverty areas because more than 20 percent of the populations in these counties are below the poverty level." Draft EIS at 21-16. Also, "[t]here are communities within these counties that have higher concentrations of minority populations and/or populations below the poverty level. These communities are mainly farming communities that have been impacted by loss in agricultural employment . . ." *Id.* There is no debate that these communities are disadvantaged communities that are negatively impacted by the lost agricultural employment that results from reductions in surface water supplies.

Conditions during the recent drought exemplify the types of impacts that occur in these disadvantaged communities, due to reductions in water supplies and the resulting land fallowing. As the EIS describes: "increased levels of land fallowing on irrigated cropland in the San Joaquin Valley has resulted in significant economic losses in small farming communities. Higher than typical unemployment rates has resulted in increased food insecurity." Draft EIS at 21-21. The Draft EIS recognizes that agriculture-dependent communities, such as Huron and Mendota, have experienced increased unemployment and increased reliance on social services "at a time when both agricultural cultivated acreage and farm employment in the area declined; and included five consecutive years with reduced water availability . . ." Draft EIS at 21-23. The observed relationship between reduced surface water supplies and reduced agricultural productivity and farm employment shows that the reductions in CVP and SWP water supplies due to implementation of the RPAs will negatively impact these agriculture-dependent communities. The Draft EIS's failure to provide any analysis of the environmental justice impacts to these areas with higher rates of minority populations and/or poverty levels from lost

farm employment is an alarming omission. These communities are already disproportionately suffering and the Draft EIS cannot turn a blind eye to the known environmental justice impacts that result from reduced CVP and SWP water supplies.

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(d) **Air Quality And Public Health Impacts Associated With Land Fallowing Are Underestimated**

The Draft EIS's unreasonable assumptions regarding future use of groundwater also infect its analysis of air quality impacts. As explained above, recent history shows that groundwater does not adequately make up for water shortages. Shortages in the almost seven years that the Smelt BiOp RPA has been implemented (six of which the Salmon BiOp RPA was also being implemented) have resulted in large-scale land fallowing. Because the Draft EIS does not properly acknowledge the extent of land fallowing that results from implementation of the RPAs, the air quality effects associated with fallowing, including increased levels of airborne dust and particulate matter and increased risk of exposure to Valley Fever, are necessarily underestimated in the Draft EIS.

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The Draft EIS acknowledges that "[a]ir quality issues may be exacerbated under dry conditions. When water supplies and irrigation levels are decreased in urban, rural, and agricultural areas, there is increased potential for the formation and transport of fugitive dust." Draft EIS, at 16-13. Yet, the Draft EIS states that because "irrigated acreage under Alternatives 1 through 5 would be similar to irrigated acreage under both the No Action Alternative and the Second Basis of Comparison[,] . . . there would be no change in potential for dust generation." Draft EIS at 16-24. This is a mistake. As explained above, there are significant changes in irrigated acreage due to implementation of the RPAs that necessarily result in a change in the potential for dust generation. Reclamation must analyze the concomitant air quality impacts.

Reclamation must also go one step further and ensure that any effects on air quality do not violate the federal Clean Air Act, 42 U.S.C. §7401 *et seq.* The Draft EIS already acknowledges that numerous counties in the Central Valley Region are designated as nonattainment for Ozone, PM 2.5, and PM 10 under state and federal Clean Air Act standards. Draft EIS at 16-8 – 16-9. Because of this, Reclamation is required to comply with various reductions and control measures designed to meet the National Ambient Air Quality Standards. It could violate the Clean Air Act if Reclamation chooses an alternative that worsens Ozone, P.M. 2.5, or PM 10 because doing so could violate measures already in place to rectify air quality problems in existing nonattainment areas. The Final EIS must make these trade-offs clear.

The federal Clean Air Act also prohibits Reclamation from engaging in any activity which does not conform to a Clean Air Act implementation plan. 42 U.S.C. 42 U.S.C. § 7506(c). Accordingly, the Final EIS should analyze the alternatives in a manner that allows the decisionmaker to determine whether or not implementation would be consistent with existing implementation plans. Until the shortcomings in Chapter 16 are corrected, the Draft EIS's analysis of air quality impacts is insufficient.

3. CVP Water Supply Impacts To CVP Wildlife Refuges And San Joaquin River Exchange Contractors Are Underestimated

The Draft also understates the CVP water supply impacts to wildlife refuges and the San Joaquin River Exchange Contractors ("Exchange Contractors"). First, as Reclamation is aware, section 3406(d) of the 1992 Central Valley Project Improvement Act ("CVPIA") requires Reclamation to deliver CVP water supplies to wildlife refuges. Section 3406(d) of the CVPIA describes two categories of refuge water supplies: "Level 2" and "Level 4." The refuges use water to provide needed habitat during waterfowl migration periods in the fall, winter, and spring. In critically dry hydrologic years, the refuge water supply contracts and section 3406(d) of the CVPIA authorize reductions in Level 2 water deliveries by no more than 25%. Shortages to the refuges are triggered when deliveries to agricultural contractors are reduced, a circumstance made more frequent and extensive due to the loss of supply from implementation of the reasonable and prudent alternatives in the biological opinions.

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Table 5.26 in the Draft EIS purports to identify the changes in CVP water deliveries under the No Action Alternative as compared to the Second Basis of Comparison for CVP refuges. For CVP refuges located south of the Delta, the table identifies *no* difference (0 acre-feet) over the long-term between the No Action Alternative and the Second Basis of Comparison. Draft EIS at 5-94. The chapter does not explain how it is possible that there will be no change in deliveries between the No Action Alternative and the Second Basis of Comparison, despite the admitted water supply loss due to the reasonable and prudent alternatives included in the No Action Alternative. The conclusion that this loss of supply makes no difference to refuge is unsupported and contrary to actual experience.

Between 1992, when the CVPIA was implemented, and 2008, when Reclamation began implementing the RPA in the Smelt BiOp, Reclamation delivered the minimum 75% of Level 2 supply to south-of-Delta wildlife refuges in just three years out of seventeen: 1992, 1993, and 1994. Reclamation, 2015 Summary of Water Supply Allocations. In contrast, since 2008, south-of-Delta wildlife refuges have been shorted to *less* than 75% in two years: in 2014, they received 65%, and in 2015, they anticipate receiving even less. While these shortages have occurred in drought years, Reclamation's ability to export water south of the Delta is adversely affected by limitations on CVP operations, which include implementation of the RPA actions. The Draft EIS must analyze how implementation of the alternatives may further limit exports, including during drought years, and then look at the real impact to south-of-Delta wildlife refuges. Receiving less than 100%, particularly less than 75%, has harmful effect on the refuges, including inability to provide habitat for local breeding wildlife and migratory shorebirds, growing food for migratory birds, and diminishing water quality. Impacts from these shortages are described in the August 21, 2015 declaration of Ricardo Ortega filed in *San Luis & Delta-Mendota Water Authority v. Jewell*, E.D. Cal. Case No. 1:15-cv-01290. Second, the Draft EIS makes the same error in estimating the difference in water supply impacts to the Exchange Contractors as it does for estimating impacts to the wildlife refuges. Table 5.26 identifies *no* difference (0 acre-feet) in annual average deliveries between the No Action Alternative and the Second Basis of Comparison for the Exchange Contractors. Draft EIS at 5-94. Again, Reclamation's Summary of Water Supply Allocations shows that the combination of RPA implementation and drought conditions have resulted in real impacts to the Exchange Contractors' water supply. Since 2008, the Exchange Contractors have been shorted to less than

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their 75% contractual minimum supply in two years: 2014 and 2015. These shortages have caused the Exchange Contractors' member entities to reduce the allocation to their growers, and growers have in turn had to fallow land and increase groundwater use. The Exchange Contractors, like the south-of-Delta agricultural water service contractors discussed elsewhere in these comments, suffer significant adverse socioeconomic impacts as a result of such shortages.

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The water supply analysis should be corrected to address the very real likelihood of shortages to refugees and the Exchange Contractors resulting from project modifications, and the concomitant impacts of these shortages should be discussed in the final EIS's resource chapters.

B. The Draft EIS Fails To Adequately Describe And Analyze The Impacts Of Increased Groundwater Use

In addition to unreasonably assuming that increased groundwater use will fully compensate for lost surface supplies, the Draft EIS fails to adequately describe or analyze the impacts of increased groundwater use in response to diminished CVP and SWP supplies. The EIS briefly acknowledges that increased groundwater use will lead to declining groundwater levels, more land subsidence, and reductions in groundwater quality, but it fails to analyze the materiality or consequences of such impacts, let alone potential mitigation.

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1. The Draft EIS Fails To Provide The Reduction In Availability Of SWP And CVP Water By Groundwater Basin

The foundation for analysis of groundwater level impacts is the change in availability of SWP and CVP water within the area being analyzed (typically a groundwater basin). While the Draft EIS provides information about the aggregate change in availability of SWP and CVP water, Chapter 7 does not quantify (with the exception of the analysis for the Central Valley Region) the change in availability by groundwater basin. Without that quantification, the basis for analysis of groundwater level impacts in the Draft EIS is unclear, which prevents decision makers and interested parties from making a meaningful review of the impacts presented in the Draft EIS.

The Draft EIS does not employ any modeling at all to assess impacts to groundwater outside the Central Valley. Absent a quantified estimate of the change in SWP and CVP water available to groundwater basins, the "impacts analysis" essentially becomes limited to general observations about how a theoretical increase in groundwater production might impact groundwater levels. This appears to be the case in this Draft EIS – for example, page 7-123 discusses impacts of the No Action Alternative relative to the Second Basis of Comparison on groundwater use and elevations for the San Francisco Bay Area, Central Coast, and Southern California Regions as follows:

Under the No Action Alternative, it is anticipated that CVP and SWP water supplies in the San Francisco Bay Area, Central Coast, and Southern California regions would be reduced as compared to CVP and SWP water supplies under the Second Basis of Comparison, as discussed in Chapter 5, Surface Water Resources and Water Supplies. The reduction in surface water supplies could

result in increased groundwater withdrawals, decreased groundwater recharge, and decreased groundwater levels in areas with CVP and SWP water users. It may be legally impossible to extract additional groundwater in adjudicated basins without gaining the permission of watermasters and accounting for groundwater pumping entitlements and various parties under their adjudicated rights.

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The essence of this analysis is that increasing groundwater production results in lower groundwater levels. While there should be general agreement with this principle, it does not provide information that is specific to groundwater basins, and does not define the potential magnitude of the impacts.

The analysis of other topics, like subsidence and groundwater quality, are closely related to groundwater levels, and without quantification of the groundwater level impacts the analysis of these other topics also appears to be limited to general principles rather than quantified impacts. For example, the Draft EIS discussion of land subsidence impacts of the No Action Alternative relative to the Second Basis of Comparison on subsidence and groundwater quality for the San Francisco Bay Area, Central Coast, and Southern California Regions again is expressed in the form of general principles rather than quantified impacts. For example, the Draft EIS discusses the potential land subsidence as follows on page 7-124:

“Increased use of groundwater and reductions in groundwater levels would result in an increased potential for additional land subsidence under the No Action Alternative as compared to the Second Basis of Comparison in the Santa Clara Valley Groundwater Basin in the San Francisco Bay Area Region, and the Antelope Valley and Lucerne Valley groundwater basins in the Southern California Region”

While there may be general agreement with the principle that reductions in groundwater levels result in an increased potential for land subsidence, information is not provided on the reductions in SWP and CVP water available to these basins that cause these impacts, and the potential subsidence impact is not quantified.

2. The Draft EIS Fails To Present Information On Changes In Groundwater Levels In A Form Useful To Decisionmakers And The Interested Public

A fundamental purpose of NEPA is to ensure that decision makers and interested members of the public have enough information about impacts to make informed decisions about the project being analyzed. The information provided needs to be in a form that is understandable, and which can be effectively used as the basis for a decision about the project. The quantified information provided on groundwater level impacts in the Central Valley Region fails to achieve that purpose because it is unnecessarily difficult to understand and interpret. As discussed below, a reader must evaluate a discussion of “post processing” in a technical

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groundwater modeling appendix in order to understand the groundwater level impacts presented within the Draft EIS. That is not reasonable.

A common method to summarize groundwater levels for alternatives is to show: (1) maps of groundwater levels at the end beginning and end of the study period, and the change in groundwater levels; and (2) hydrographs of groundwater levels at selected locations, which show the groundwater level trends. These types of presentations provide useful information that is relatively easy to understand. For example, the maps can provide a basis to understand what areas experience declines in groundwater levels and how large those declines are over the period analyzed. That helps show if a given groundwater basin is in overdraft, what areas might be susceptible to subsidence, and what the flow patterns are. This type of information has presumably already been developed using the model, and should be included in the Draft EIS.

Information about groundwater levels for each alternative can then be supplemented with quantified information that compares different alternatives (for example, maps of differences in groundwater levels at the end of the study period between alternatives, and hydrographs at selected locations showing the differences in groundwater levels over time).

The Draft EIS does not include information on groundwater levels for each alternative, and instead is limited to information that shows differences between alternatives. This does not give decision makers and interested parties a full understanding of groundwater conditions needed to evaluate the impacts of the project. For example, because only differences in groundwater levels are provided, there is no information about whether groundwater levels are rising or falling in any particular alternative, which may impact an assessment of the potential for subsidence.

The maps presenting differences between alternatives are not clearly explained within the Draft EIS. For example, Figure 7.15 (titled "Forecast Groundwater-Level Changes for Alternative 2 and No Action Alternative Compared to Second Basis of Comparison for Average July in a Future Wet Year") is difficult to interpret, leaving decision-makers and the interested public to attempt to interpret these results. Possible interpretations might include:

- Interpretation A - The difference in groundwater levels represents the difference that would occur between two scenarios for a single occurrence of a future wet year. Under this interpretation, the map can be read as showing in some areas might experience from 200 to 500 feet of lowering of groundwater levels in an individual year.
- Interpretation B - The difference in groundwater levels represents an average for all years classified as "wet." Under this interpretation, the map can be read as showing groundwater levels in some areas might be from 200 to 500 feet lower on average in years classified as "wet," but does not tell a reader anything about what happens in an individual year.

Because the Draft EIS does not include information about groundwater levels for each alternative individually, a reader cannot look at the groundwater levels for each alternative to try

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and interpret what these differences might mean, which complicates the interpretation of information like Figure 7.15.

The text of the Draft EIS also does not help a reader understand what the results are. For example on page 7-121 groundwater level impacts are described as follows:

Overall, under the No Action Alternative as compared to the Second Basis of Comparison, July average groundwater levels decrease approximately 2 to 10 feet in most of the central and southern San Joaquin Valley Groundwater Basin in all water year types. July average groundwater levels decline 10 to 50 feet in the Delta-Mendota, Tulare Lake, and Kern County subbasins; and 100 to over 200 feet in the Westside subbasin in all water year types. In critical dry years, groundwater levels decline by up to 200 feet in the Westside subbasin. Groundwater level changes in the Sacramento Valley are forecast to be less than 2 feet. The groundwater level change hydrographs show that in the central and southern San Joaquin Valley, groundwater levels can fluctuate up to 200 feet in some areas due to climatic variations under the No Action Alternative compared to the Second Basis of Comparison.

It is not clear whether the differences in groundwater levels between the two scenarios represent changes in levels that might be experienced in a single year, or if they are differences in groundwater levels which have been averaged over a number of years. This language can be read to be consistent with either Interpretation A or Interpretation B above.

Based on our review, to resolve this question a reader must make a close reading of Section 7A.3.1 ("Post-Processing and Results Analysis") of Appendix 7A to understand what the results presented in the Draft EIS actually mean (and even then, it is complicated by the lack of results for individual alternatives that can be used to help confirm the interpretation). Our best judgment is that the interpretation in the second bullet above (Interpretation B) is the correct one, though we are not 100 percent certain of that interpretation.

The interpretation of the hydrographs presenting differences in groundwater levels over time at specific locations between alternatives (for example, Figure 7.21 which is titled "Forecast Groundwater-Level Change Hydrographs for Alternative 2 and No Action Alternative Compared to Second Basis of Comparison at Example Locations in the San Joaquin Valley") has similar complications to the maps showing groundwater level changes. Based on our review of Section 7A.3.1 of Appendix 7A, our best judgment is that these graphs show the difference in the groundwater levels at a given location between two alternatives, though again we are not 100 percent certain of that interpretation.

3. The Draft EIS Fails To Provide Information Regarding Long-Term Decline In Groundwater Levels Due To Implementation Of The RPAs

The Draft EIS fails to describe the aggregate impacts to groundwater levels due to the expected increase in groundwater pumping from now through 2030, and beyond. The Draft EIS

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acknowledges that groundwater levels have experienced significant declines over the last few years, due to increased groundwater pumping in reaction to diminished supplies of surface water. For example, the Draft EIS states that “[r]ecent information indicates that between the spring 2010 and spring 2014, groundwater levels declined at some wells in the Delta-Mendota subbasin by up to 20 feet (DWR 2014c, 2014d). Draft EIS at 7-30 – 7-31. In addition, the Draft EIS acknowledges that “[r]ecent information indicates that between the spring 2013 and spring 2014, groundwater levels have declined at some wells in the Westside subbasin by up to 40 feet within the 1-year period (DWR 2014c, 2014d).” Draft EIS at 7-42. Yet, the Draft EIS does not discuss the implications of similar periods of groundwater draw down that are expected in the future due to implementation of the RPAs.

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The Draft EIS states that the reasonable and prudent alternatives in the biological opinions will result in declines in groundwater levels in the future. The Draft EIS states:

In areas of the Central Valley Region that use CVP water service contract and SWP entitlement contract water supplies, the CVP and SWP water supplies would be less under the No Action Alternative as compared to the Second Basis of Comparison. The differences would result in increased groundwater use and decreased groundwater levels in the San Joaquin Valley Groundwater Basin under the No Action Alternative as compared to the Second Basis of Comparison.

Draft EIS at 7-121. In particular, “July average groundwater levels decline 10 to 50 feet in the Delta-Mendota, Tulare Lake, and Kern County subbasins; and 100 to over 200 feet in the Westside subbasin in all water year types. In critical dry years, groundwater levels decline by up to 200 feet in the Westside subbasin.” Draft EIS at 7-121. Yet, the Draft EIS provides no analysis of the significance of such declines, nor does it analyze whether the affected groundwater basins can withstand the expected levels of decline. The Draft EIS fails to explain the consequences of such significant declines in groundwater levels in any meaningful detail. Critically, the Draft EIS fails to evaluate the aggregate impacts to groundwater levels if the RPAs are implemented from now until 2030. If the RPAs result in consistent declines in groundwater levels because of reductions in surface water supplies, what are the implications for groundwater availability, groundwater quality, and land subsidence? The Draft EIS fails to tell decision makers or the public what are the aggregate impacts to groundwater levels, or the expected consequences of a long-term trend of declining groundwater levels. This is a significant omission that must be remedied in the final EIS.

4. The Draft EIS Omits The Modeling Results And Data Regarding Land Subsidence

While the Draft EIS acknowledges that certain areas are experiencing significant land subsidence as a result of increased groundwater use, the Draft EIS provides only a limited and qualitative analysis of expected land subsidence. In fact, the Draft EIS omits the land subsidence modeling results that show the expected total subsidence resulting from groundwater use, claiming that the results are “overly conservative.” The Draft EIS states:

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CVHM includes a module known as the SUB package that computes the cumulative compaction of each model layer during the model simulation. The cumulative layer compactions at the end of the simulation are summed into a total subsidence. However, this version of the SUB package does not consider the potential reduction in the rate of subsidence that would occur as the magnitude of compaction approaches the physical thickness of the affected fine-grained interbeds. Thus, subsidence forecasts from the predictive versions of CVHM were judged to be overly conservative. Therefore, a qualitative approach was used for the estimation of the potential for increased land subsidence in areas of the Central Valley that have historically experienced inelastic subsidence due to the compaction of fine-grained interbeds.

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Draft EIS at 7-112; *see id.* at 7A-17. Reclamation's decision to omit available land subsidence modeling results from the Draft EIS does not serve the informational purposes of NEPA. If Reclamation concluded that the results were overly conservative, it should explain why, but still provide the results to help inform the decision-makers and the public. In addition, Reclamation should identify what information, if any, supports the conclusion that the rates of subsidence would decline by 2030. Reclamation should also identify what information supports its conclusion that the subsidence estimated by the groundwater model is "overly conservative."

The Draft EIS's qualitative analysis of land subsidence impacts is effectively meaningless. Despite acknowledging the observed impacts of land subsidence, the Draft EIS does nothing more than tell the reader that the implementation of the reasonable and prudent alternatives will make land subsidence worse in the future. The Draft EIS confirms that in "areas adjacent to the Delta-Mendota Canal in this subbasin, extensive groundwater withdrawal has caused land subsidence of up to 10 feet in some areas. Land subsidence can cause structural damage to the Delta-Mendota Canal which has caused operational issues for CVP water delivery." Draft EIS at 7-31. Yet, in describing the expected land subsidence associated with implementing the reasonable and prudent alternatives, the Draft EIS only provides a "there will be more" conclusion. The Draft EIS states: "Under the No Action Alternative, potential for land subsidence due to groundwater withdrawals in the Delta-Mendota and Westside subbasins of the San Joaquin Valley Groundwater Basin would increase as compared to the Second Basis of Comparison due to the increased groundwater withdrawals." Draft EIS at 7-122. The Draft EIS also says: "increased groundwater pumping under the long-term average conditions may result in an additional increment of subsidence in those areas within the Central Valley. The additional amount of subsidence and the economic costs associated with it have not been quantified in this EIS. However, total subsidence-related costs have been shown to be substantial, as reported by Borchers et al. (2014) who estimated that the cost of subsidence in San Joaquin Valley between 1955 and 1972 was more than \$1.3 billion (in 2013 dollars). These estimates are based on the impacts to major infrastructure in the region including the San Joaquin River, Delta Mendota Canal, Friant-Kern Canal and San Luis Canal in addition to privately owned infrastructure. The incremental subsidence-related costs, expressed on an annual basis, could be an unknown fraction of that cumulative cost." Draft EIS at p. 19-49; *see also* p. 19-61. Thus, the Draft EIS confirms that increased land subsidence will result from implementation of the reasonable and

prudent alternatives, and will likely be a problem, but it leaves unanalyzed and unanswered how big a problem.

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5. The Draft EIS Fails To Account For Or Analyze Expected Impacts To Groundwater Quality

Likewise, the Draft EIS provides no meaningful analysis of expected impacts to groundwater quality. The “Groundwater Model Documentation” in Appendix 7A indicates that one of the modeling objectives was to evaluate “[c]hanges to groundwater quality based on a potential inducement of migration of poor quality groundwater because of groundwater flow changes.” Draft EIS at 7A-3. However, there is no further discussion of how the model would be used to make this evaluation.

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Despite extensive acknowledgement of existing groundwater quality issues, and the stated intent to use the groundwater model to evaluate groundwater quality, the Draft EIS merely provides a qualitative analysis of groundwater quality impacts associated with implementing the reasonable and prudent alternatives. For example, the Draft EIS states: “In areas that use CVP and SWP water supplies, groundwater quality under the No Action Alternative could be reduced as compared to the Second Basis of Comparison in the central and southern San Joaquin Valley Groundwater Basin due to increased groundwater withdrawals and resulting potential changes in groundwater flow patterns.” Draft EIS at 7-122. The Draft EIS makes no effort to describe the extent or magnitude of impacts to groundwater quality, nor does the Draft EIS consider the implications of degraded groundwater quality in areas that are already experiencing groundwater quality issues. At a minimum, the Draft EIS should provide informative examples of the types of groundwater quality degradation that may occur in particular regions and how the degradation may impact the ability to use that water for municipal or agricultural use. Simply stating that groundwater quality would be “reduced” does not provide the decision makers or the public with sufficient information to evaluate the impacts of implementing the existing reasonable and prudent alternatives, or to allow for meaningful comparison among the alternatives.

C. The Draft EIS’s Analysis Of Effects On Surface Water Resources And Water Supplies Is Inadequate

1. The Draft EIS Presents Incomplete Modeling Information Regarding Surface Water Supplies

Chapter 5 and its accompanying appendices present an incomplete picture of the modeling work that supports Reclamation’s conclusions regarding surface water supply. Revision is required.

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First, a partial set of CalSim II model results are reported in Appendix 5A, but the Draft EIS does not explain why these particular set of outputs or metrics have been selected and does not describe their importance. For example, the significance of flows through Steamboat Slough is not described. There is also no explanation of why results for Millerton Reservoir are presented in the comparative analysis when simulation of the CVP Friant Division is identical across all alternatives.

Second, the Draft EIS does not adequately explain its assumptions or its modeling of changed circumstances. For example, the reasonable and prudent alternative in the NMFS BiOp requires Reclamation to achieve certain end-of-September and end-of-April storage resulting from the operation of Lake Shasta for a percentage of years. Draft EIS at 3A-31. The Draft EIS states that no specific CalSim II modeling code is implemented to simulate these performance measures (Draft EIS at 5A-9) and there appears to be no check that these performance measures are being met. Indeed, figures presented in Appendix 5A (Draft EIS at 5A-159 and 5A-161) suggest these criteria are not being met. Reclamation should explain why it is not simulating performance measures, and its rationale for not ensuring that performance measures are being met.

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Reclamation should also revise the Draft EIS to explain its treatment of changing demands. For example, the Draft EIS provides: "By 2030, water demands associated with water rights and CVP and SWP contracts in the Sacramento Valley [are] projected to increase by 443,000 acre-feet per year, especially in the communities in El Dorado, Placer, and Sacramento Counties." Draft EIS at 5-66. The Draft EIS does not explain if or how these increased demands are represented in CalSim II.

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Third, the Draft EIS should provide further explanation of its treatment of modeling anomalies. For example, the Draft EIS states: "in very dry years, the model simulates minimum reservoir volumes (also known as 'dead pool conditions') that appear to prevent Reclamation and DWR from meeting their contractual obligations, including water deliveries." Draft EIS at 5-63. Further discussion of these anomalies in simulated reservoir operations should be included in the final environmental document. In real time operations reservoirs are operated to avoid dead pool conditions and measures taken could include relaxation of some flow criteria or changes to contract allocation procedures, impacting deliveries. Allowing simulated storage to fall to dead pool may result in an over-estimate of CVP delivery capability to CVP contractors south-of-the-Delta in dry years.

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2. The Draft EIS Does Not Set Necessary Thresholds Of Significance

Chapter 5 also fails to allow decisionmakers and the public to understand how the proposed modifications in the various alternatives will have different effects on surface water supply. The Draft EIS does not explain whether the reasonable and prudent alternatives and the proposed operation of the CVP and SWP would significantly affect the quality of the human environment. The Draft EIS Executive Summary includes a list of substantial beneficial and adverse impacts; however thresholds or levels of significance for metrics are not set.

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The Draft EIS states that "CalSim II model output includes minor fluctuations of up to 5 percent due to model assumptions and approaches. Therefore, if the quantitative changes between a specific alternative and the No Action Alternative and/or Second Basis of Comparison are 5 percent or less, the conditions under the specific alternative would be considered to be "similar" to conditions under the No Action Alternative and/or Second Basis of Comparison." Draft EIS at 5-60. While there is uncertainty associated with any model results, the selection of 5 percent as the level to define "similar" conditions is unsupported and is in conflict with other environmental projects and programs that have used CalSim II for impact analysis.

The Draft EIS defines an appropriate use of modeling results as identifying trends that differentiate alternatives and for quantifying specific levels of impacts. Applying the 5 percent threshold to average monthly or average annual values may result in not reporting significant trends. The 5 percent threshold would seem more appropriate when applied to individual monthly results, not averages.

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3. The Draft EIS Improperly Treats Climate Change And Sea-Level Rise

The Draft EIS's modeling of climate change and sea level rise also warrants revision. As noted elsewhere in these comments, the Draft EIS analyzes future conditions projected for the year 2030. Assumptions regarding sea-level rise and climate change are included in all of the alternatives, including the No Action Alternative and Second Basis of Comparison. These assumptions are the same across all alternatives. Therefore, the effects of climate change and sea-level rise are assumed to be similar across all alternatives.

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The Draft EIS deviates from past practice by not also presenting an analysis of the future No Action Alternative *without* the effects of climate change. For example, the 2015 SWP Delivery Capability Report published by DWR presents model results for a "base" scenario and an "early long-term" scenario. The latter includes climate effects associated with a 2025 time horizon and a 15 cm sea-level rise, the former does not.

Model results for the No Action Alternative cannot be compared to current or recent historical CVP and SWP operations because the effects of climate change cannot be isolated from the effects of changing regulatory requirements, land use, and facilities.

The analysis of alternatives with climate change and sea-level rise appears to be consistent with past studies and reports produced by DWR and Reclamation. However, the Draft EIS fails to present or discuss any sensitivity analysis for climate change assumptions. Such an analysis could include climate change scenarios based on GCM results representing warmer and drier conditions rather than the Q5 scenario, which is derived from the central tendency consensus of climate projections. Similarly, no sensitivity is presented for sea-level rise. For example, a 12 cm or 18 cm rise, which corresponds to the range of projections from the work conducted by Rahmstorf, could also be considered. There is little discussion of whether the use of more recent IPCC CMIP 5 climate projections would significantly change the analysis. More explanation is required.

4. Additional Errors And Inconsistencies In Chapter 5 And Its Accompanying Appendices

CalSim II model results are summarized in Chapter 5 of the Draft EIS and are presented in more detail in Appendices 5A through 5C. There are some errors and inconsistencies in these reported results. For example, south-of-Delta average annual CVP M&I deliveries under the No Action Alternative are reported as 15 TAF per year (Table C-19-1-2). This value is extremely low and inconsistent with the corresponding exceedance plot (Figure C-19-1-5). The geographical breakdown of M&I deliveries also appears to be incorrect; no CVP M&I deliveries are reported for the Tulare Lake Region (Table C-19-1-1). Some mislabeling of results adds to

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the confusion. For example, total CVP deliveries south-of-Delta are stated to include "Settlement" deliveries (Table C-19-1-2). Instead, results are the total of water service contract deliveries and refuge deliveries. Deliveries to the Exchange Contractors are not reported, although Settlement Contractor deliveries are reported under the Sacramento Valley. Reclamation should review the presentation of model results for correctness and consistency.

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D. The Analysis Of Effects On Aquatic Species In Chapter 9 Is Inadequate

Chapter 9 of the Draft EIS is intended to describe the fish and aquatic resources that occur in the portions of the project area that could be affected as result of implementing the alternatives evaluated in the EIS and to describe the potential impacts to those resources. However, Chapter 9 includes flaws in both its description of the affected environment and its analysis of impacts.

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1. Chapter 9's Discussion Of Affected Environment Requires Revision

The Draft EIS's discussion of affected environment in Chapter 9 requires revision because it contains a number of unsupported statements and includes a number of statements that are not based on the best and most current science. Such statements must be supported or revised in the Final EIS, at minimum to ensure the final environmental document complies with the requirement in the CEQ regulations that "[a]gencies . . . insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements" and "identify any methodologies used and . . . make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement." 40 C.F.R. § 1502.24.

Without revision, Chapter 9's conclusory statements made without support will run afoul of NEPA's requirements. For example, at page 9-57, lines 38-39, the Draft EIS states that "[spring-run Chinook Salmon] [y]earlings typically enter the Delta as early as November and December and continue outmigration through at least March." The Draft EIS does not explain how yearling spring-run are being identified, whether by length at date criteria or genetics. Reclamation cites NMFS 2009 in support, which in turn cites to Snider and Titus 2000. Snider and Titus 2000 describe using length at date criteria, and nowhere say that yearling spring-run typically enter the Delta in November through mid-March. In fact, under the length at date criteria there is no yearling spring-run sized Chinook in November and December; yearling spring-run ends in mid-October. In order to insure scientific integrity of this statement, it must be accurate, and it must be supported. There is a great deal of uncertainty when using length at date criteria to distinguish yearling spring-run from other juveniles that needs to be acknowledged.

The discussion regarding nonnative invasive species at page 9-80 provides another example. There, the Draft EIS states that "[n]ot all nonnative species are considered invasive or harmful. Some introduced species do not greatly affect the ecosystem, or have minimal ability to spread or increase in abundance. Others have commercial or recreational value (e.g., Striped Bass, American Shad, and Largemouth Bass)." *Id.* at 9-80. This statement is unsupported, and is contrary to the general understanding that *all* nonnative species increase competition and therefore are considered invasive or harmful where they prey on or compete with native species. That some may value these species for other reasons does not remove their adverse effect on

native species. Finally another example of an unsupported—and therefore problematic—statement in Chapter 9 is at page 9-97, in the discussion of predation. At lines 22-27, the Draft EIS notes NMFS made reference to predation studies regarding predation loss on the Tuolumne and Stanislaus rivers that showed significant loss in run-of-river gravel mining ponds and dredged areas. Yet, the Draft EIS also notes that NMFS's statements were made *without citation*; without adding citation, Reclamation cannot now adopt NMFS's observations wholesale. Doing so would lack "scientific integrity" and would be contrary to 40 C.F.R. § 1502.24. Revision of Chapter 9 is required to ensure that these, and similarly unsupported statements, identify and be consistent with scientific support.

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Additional portions of the affected environment section of Chapter 9 require revision to add references to the best and most recent science. In several places Chapter 9 cites outdated science in the face of more recent science. For example, at page 9-56, the Draft EIS uses Feyrer et al. 2007 to support the connection between X2 and hypothesized habitat, but does not support a connection between X2 and presence or absence of Delta Smelt. This discussion should be revised to add reference to the more recent Feyrer 2011 study, but that study also does not provide a connection between X2 and the presence or absence of Delta Smelt. And Kimmerer et al. 2013, at page 13, warrants discussion, as it explains that X2, or the volume of the low salinity zone, in the spring and fall are not a driver of Delta Smelt abundance, and notes that "[g]iven the difficulty in determining the controls on the delta smelt population, it is not surprising that such a simple descriptor of habitat is inadequate for this species." Another example of a statement requiring revision to reference updated science is at page 9-92. The Draft EIS notes that "the cause of the mortality in the ship channel has not been studied," and identifies possible causes for mortality. However, certain posited causes, i.e., low dissolved oxygen and water quality have been resolved by aeration and upgrades to the Stockton sewage treatment plant, respectively.

The comments submitted by the State Water Contractors identify additional examples of outdated or mis-cited scientific studies, or misstatements of the available data in Chapter 9. The Authority, Westlands, and the Exchange Contractors join in those comments.

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2. Chapter 9's Impact Analysis Discussion Is Flawed

The resource chapters' "Impact Analysis" sections are intended to allow the comparison of environmental consequences of the No Action Alternative and Second Basis of Comparison to the environmental consequences of the Action Alternatives. In Chapter 9, however, the Draft EIS fails to present the impacts of the alternatives in a manner that "sharply defin[es] the issues and provid[es] a clear basis for choice among options by the decisionmaker and the public." 40 C.F.R. § 1502.14. With respect to impacts on fish and aquatic resources, the key issue is whether the proposed modifications in the various alternatives will avoid jeopardizing listed species—accordingly, Chapter 9 must enable a comparison among the alternatives that addresses jeopardy. To the extent possible, that analysis should be quantitative.

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In order to undertake a useful comparison among the alternatives, the final EIS must allow its readers to answer a number of questions: How many more fish are expected to survive and reproduce under one scenario as opposed to another? If reverse flows in Old and Middle rivers are limited by other existing non-ESA regulations but not by additional measures under the ESA, what are the expected effects on population abundance? If additional restrictions on such

flows are imposed under the ESA, what is the expected effect on abundance of listed species? Do other measures that do not involve restrictions on CVP and SWP operations, such as habitat restoration, offer greater promise of improving abundance? The Draft EIS does not answer any of these or similar questions.

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The synthesis and conclusion sections of Chapter 9's impacts analysis are lacking. First, Chapter 9 contains a number of conclusory statements that seem to lack any analytic support at all. For example, in discussing changes in fish entrainment, the Draft EIS states that "[c]hanges in CVP and SWP operations can affect through-Delta survival of migratory (e.g., salmonids) and resident (e.g., Delta and Longfin smelt) fish species through changes in the level of entrainment at CVP and SWP export pumping facilities." Draft EIS at 9-113. This statement is unsupported. There is no evidence that exports are negatively related to through-Delta survival based on CWT and acoustic tag experiments, and there is no support for concluding that entrainment is related to abundance. This conclusory statement is not based on scientific evidence.

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Another example comes in the Draft EIS's discussion of the Second Basis of Comparison, the Draft EIS states that "[s]imilar to the No Action Alternative, reasonable and foreseeable non-CVP and -SWP water resources projects to provide additional water supplies would be implemented, in addition to restoration of more than 10,000 acres of intertidal and associated subtidal wetlands in Suisun Marsh and Cache Slough; and up to 20,000 acres of seasonal floodplain restoration in the Yolo Bypass." *Id.* at 9-150. Yet, despite this significant restoration, the Draft EIS concludes "[i]t is not likely that operations of the CVP and SWP under the Second Basis of Comparison would result in improvement of habitat conditions in the Delta or increases in populations for these fish by 2030, and the recent trajectory of loss would likely continue." *Id.* This conclusion specifically, and Chapter 9 generally, both elicit the same question—why? Why, if there will be significant habitat restoration, is the Second Basis of Comparison not expected to result in improvement of habitat conditions in the Delta? The Draft EIS fails to explain that factors other than habitat restoration may be more significant in affecting population loss, or to provide any explanation at all for its conclusion.

Second, Chapter 9 fails to contain any synthesis or conclusions that address the *significance* of effects from the different alternatives on listed species. Nowhere does the chapter identify whether one alternative as compared to another (or to the No Action Alternative or the Second Basis of Comparison) will have any population level effects. As stated repeatedly in these comments, it is crucial that decisionmakers and the public be able to determine whether an alternative avoids jeopardizing listed species. An assessment of any population level effects is important to that determination. The discussion in the Draft EIS does not enable such assessment. For example, in Chapter 9's comparison of the No Action Alternative to the Second Basis of Comparison for Coho Salmon in the Trinity River Region, it states that long term average monthly water temperatures would be similar to, although slightly higher than temperatures under the No Action Alternative as compared to the Second Basis of Comparison. The discussion notes that the temperature model outputs indicate that the temperature threshold for coho "would be exceeded about 8 percent of the time in October, about 1 percent more frequently than under the Second Basis of Comparison." *Id.* at 9-154. Here the Chapter identifies a quantitative difference, but does not explain what exceeding the threshold means for Coho Salmon—does the entire year-class die if the threshold is exceeded? If that is the case, is it

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possible that a 1 percent increase in the exceedance of the threshold may have a population level effect? Why or why not?

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Elsewhere, the Draft EIS notes that “[i]n the estimation of potential entrainment loss and comparison of the results for each of the alternatives, differences in entrainment estimates of greater than 5 percent between alternatives are considered biologically meaningful, with potential effects on Delta Smelt.” Draft EIS at 9-114. Again, this statement fails give any explanation as to why or how Reclamation determined that a 5 percent difference in calculated entrainment would be considered biologically meaningful; the statement begs the question—what is the effect of a 5 percent change in calculated entrainment on the Delta Smelt population as a whole? Is there population-level significance?

Chapter 9’s comparison of the No Action Alternative to the Second Basis of Comparison with respect to spring-run Chinook Salmon provides another example of the Draft EIS’s failure to address the significance of impacts. After discussing model results, the chapter notes that “overall, effects on spring-run Chinook Salmon could be slightly more adverse under the No Action Alternative than under the Second Basis of Comparison, with a small likelihood that spring-run Chinook Salmon production would be lower under the No Action Alternative.” *Id.* at 9-171. This statement does not explain what “slightly more adverse” means in the context of a jeopardy analysis. Is there a population level effect under the No Action Alternative versus Second Basis of Comparison? Why or why not? Similar questions exist with respect to the chapter’s summary of effects for other species, including steelhead, Green Sturgeon, and others. *See, e.g.*, Draft EIS at 9-190 (“overall, effects on steelhead could be slightly more adverse under the No Action Alternative than under the Second Basis of Comparison”), 9-193 (“Overall, the increased frequency of exceedance of temperature thresholds under the No Action Alternative could increase the potential for adverse effects on Green Sturgeon in the Sacramento and Feather rivers relative to the Second Basis of Comparison.”). The failure to explain the significance of impacts precludes decisionmakers from complying with their charge under NEPA.

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Third, Chapter 9’s Impact Analysis fails to appropriately note the relative significance of impacts from CVP and SWP operations compared to impacts from other stressors. Although modifications of CVP and SWP operations to adjust outflow and reduce entrainment have been the primary method of addressing problems with Bay-Delta ecosystem management, there is little evidence that such modifications have been effective for improving or protecting the health of listed species or their habitat.⁹ The populations of the Delta Smelt and other listed species have declined in the more than six years since the RPAs from the 2008 and 2009 BiOps began being implemented. *See, e.g.*, Draft EIS at 9-63. Chapter 9 does not analyze one of likely reasons for this fact, e.g. the low relative importance of CVP and SWP operations on the status of the species in the context of multiple stressors. Chapter 9 acknowledges the existence of other stressors for listed species, but does not explain which of these stressors are of equal or greater significance to species’ population levels versus CVP and SWP projects, or explain the scale of flow variations resulting from such modifications versus the natural flow variations due to the Bay-Delta tidal system.¹⁰ NMFS’s 2014 Recovery Plan for the Evolutionarily Significant Units

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⁹ The Authority, Westlands, and the Exchange Contractors incorporate their September 2012 and July 2014 comments on related topics to provide further support for the points in these comments.

¹⁰ In addition to discussing the relative significance of fluctuations in flow due to CVP and SWP operations versus the tide, the final EIS should expressly acknowledge the limits in the available scientific data related to effects of

of Sacramento river Winter-Run Chinook Salmon and Central Valley Spring-Run Chinook Salmon and the Distinct Population Segment of California Central Valley Steelhead provides a helpful resource for such comparisons. NMFS 2014 (attached) at A-1 (showing relative significance of entrainment versus harvest, predation, and other stressors).

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Finally, Chapter 9 is problematic because it seems to purposefully avoid using recent science that would tend to show the reduced relative importance of CVP and SWP operations on listed species. For example, Chapter 9 contains the following discussion regarding X2 and Delta Smelt:

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The overlap of the low salinity zone (or X2) with the Suisun Bay/Marsh is believed to lead to more favorable growth and survival conditions for Delta Smelt in fall. (Baxter et al. 2010; Feyrer et al. 2011). To evaluate fall abiotic habitat availability for Delta Smelt under the alternatives, X2 values (in km) simulated in the CALSIM II model for each alternative were averaged over September to December, and compared for differences. There are uncertainties and limitations associated with this approach, e.g., it does not evaluate other factors that influence the quality or quantity of habitat available for Delta Smelt (e.g., turbidity, temperature, food availability), nor does it take into account the relative abundance of Delta Smelt that might benefit from the available habitat in the simulated X2 areas, in any given year. Other scientists have developed and described life cycle models to evaluate Delta Smelt population responses to changes in flow-related variables (e.g., Maunder and Deriso 2011; Rose et al. 2013 a, b; Reed et al. 2014), but these life cycle modeling approaches were not selected for use in the current study. In this study, simulated fall X2 values are used as a tool to compare the alternatives, as one of the factors that would indicate suitable habitat to benefit Delta Smelt.

Draft EIS at 9-115. This approach has acknowledged limitations, and is based on outdated science (e.g. Baxter et al. 2010, Feyrer et al. 2011). Yet, Reclamation announces that it does not use more recent life cycle modeling approaches in the Draft EIS, but does not explain why. Would the more recent studies produce different conclusions? More detail is required.

In sum, the Draft EIS's description of the affected environment of and impacts to fish and aquatic resources from the alternatives is flawed. Significant revision is required in order to enable readers of the final environmental document to understand and evaluate the real impacts of the alternatives on listed aquatic species.

additional outflow. Given the many stressors and changes in the Bay-Delta ecosystem, there is significant uncertainty about the potential benefits of increased outflow for Delta Smelt, longfin smelt, and several other species including white sturgeon and green sturgeon. (Delta Science Program 2014.) Numerous studies have concluded that more flow is not necessarily the solution in highly altered systems. (Poff et al. 1997; Hart and Finelli 1999; Bunn and Arthington 2002; Poff and Zimmerman 2010.) Efficient or targeted use of flow is more likely to attain specific ecological benefits, particularly when paired with additional actions to address non-flow stressors.

III. RECLAMATION MUST SIGNIFICANTLY REVISE THE EIS TO MEET ITS NEPA OBLIGATIONS

To date, Reclamation has failed to utilize the NEPA process for its intended purpose – to infuse environmental considerations into its decision and inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts to the human environment. As the Council on Environmental Quality’s regulations explain:

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The primary purpose of an environmental impact statement is to serve as an action-forcing device to insure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the federal government. It shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment. . . . Statements shall be concise, clear, and to the point, and shall be supported by evidence that the agency has made the necessary environmental analyses. An environmental impact statement is more than a disclosure document. It shall be used by federal officials in conjunction with other relevant material to plan actions and make decisions.

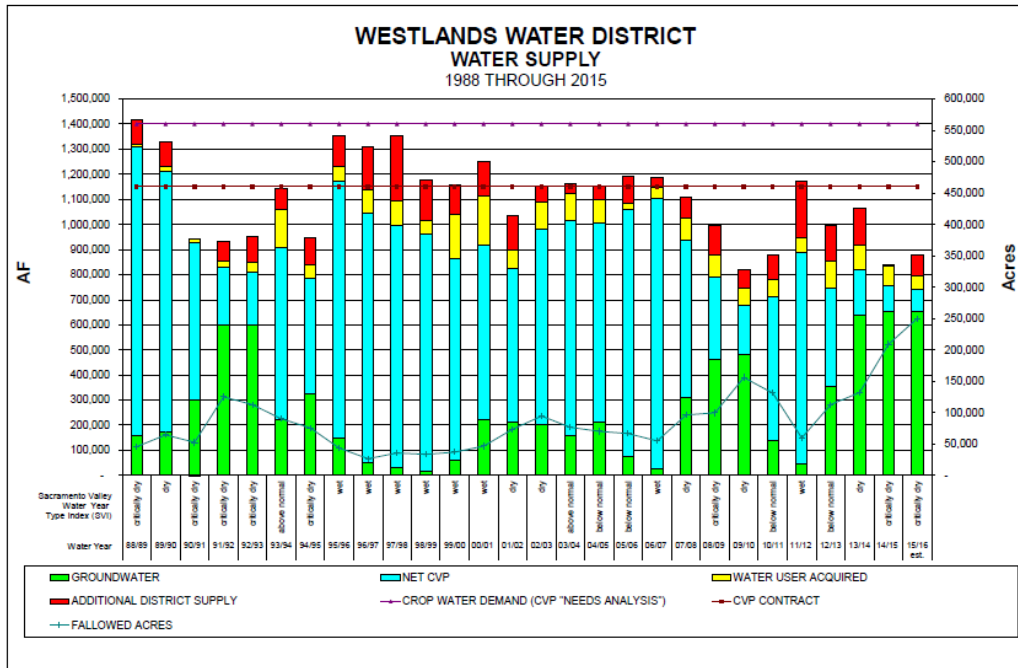
40 C.F.R. § 1502.1. The Draft EIS fails to achieve this primary purpose.

As detailed above, Reclamation must significantly revise the Draft EIS to satisfy its NEPA obligations. The Authority, Westlands, and the Exchange Contractors urge Reclamation to perform the requisite analyses and disclosures to inform decisionmakers and the public before a decision is made regarding possible modifications to CVP and SWP operations. Reclamation’s upcoming decision has the potential to have significant environmental consequences throughout California and exacerbate the impacts of the state’s on-going drought. In the face of such an important decision, it is critical the Reclamation perform a thorough NEPA analysis, one that critically examines alternatives and mitigation measures that can minimize or avoid impacts to the human environment.

EXHIBIT C

WESTLANDS WATER DISTRICT WATER SUPPLY GRAPH

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\\wld.local\freedom\Resources\Files\WS-Surface\Water Supply History\Total Historical Deliveries (NET CVP) Classification.xls

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July 14, 2015

BY EMAIL: GKRZYS@USBR.GOV

Mr. Greg Krzys
Bureau of Reclamation, Bay-Delta Office
801 I Street, Suite 140
Sacramento, CA 95814-2536

Re: Second Administrative Draft Environmental Impact Statement for the
Coordinated Long-term Operation of the Central Valley Project and State
Water Project

Dear Mr. Krzys:

The San Luis & Delta-Mendota Water Authority and Westlands Water District (together "Public Water Agencies") appreciate the opportunity to comment on the second Administrative Draft Environmental Impact Statement for the Coordinated Long-term Operation of the Central Valley Project and State Water Project ("Second Admin Draft EIS"). The Second Admin Draft EIS improves upon the last draft, which the Public Water Agencies commented on in 2013.¹ However, the Public Water Agencies have continuing, significant concerns, and suggestions for further improvements that are necessary to ensure compliance with the National Environmental Policy Act ("NEPA").

In its coming Record of Decision, the United States Bureau of Reclamation ("Reclamation") will be making policy decisions on a matter of vital importance to the future of protected species and millions of people and acres of prime farm land. Those must be new and thoughtful decisions, not reflexive re-adoption of the decisions it made some seven years ago to implement the reasonable and prudent alternatives in the existing biological opinions. Those past policy decisions relied upon science that is now outdated, and were not informed by the critical social and environmental impacts realized over the past four years of drought and changes in regulatory approaches. And, those past decisions were illegal, because they were made without the benefit of any environmental review under NEPA.

¹ The Public Water Agencies submitted written comments on June 28, 2012 in response to the notice of intent and scoping, and on May 3, 2013 in response to an earlier version of an administrative draft environmental impact statement. The Public Water Agencies incorporate those prior comments, including all attachments, in these comments.

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The supporting analysis and justification for Reclamation's new choices, now informed by NEPA review, must be thorough and transparent. To the fullest extent possible, the information and presentation in the final environmental impact statement should inform the public and policy makers of the necessity for and expected benefit of any changes to CVP and SWP operations to meet the requirements of the federal Endangered Species Act, the available alternatives, and the trade-offs among the available alternatives. As the Council on Environmental Quality's regulations explain:

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The primary purpose of an environmental impact statement is to serve as an action-forcing device to insure that the policies and goals defined in the Act are infused into the ongoing programs and actions of the federal government. It shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment. . . . Statements shall be concise, clear, and to the point, and shall be supported by evidence that the agency has made the necessary environmental analyses. An environmental impact statement is more than a disclosure document. It shall be used by federal officials in conjunction with other relevant material to plan actions and make decisions. (40 CFR § 1502.1.)

The Public Water Agencies' comments are intended to help Reclamation prepare an EIS that serves this purpose.

The Public Water Agencies were first provided access to the Second Admin Draft EIS on June 30, 2015. Reclamation has requested comments by July 14, 2015. Given the length of the document, including numerous supporting technical appendices, two weeks is insufficient time to complete a thorough review or provide detailed comments. Therefore, in this letter the Public Water Agencies provide only the following brief, general comments. The Public Water Agencies will provide more detailed comments by the deadline for public comment, which we understand will be September 29, 2015.

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First, the Public Water Agencies note that the No Action Alternative in the Second Admin Draft EIS includes implementation of the reasonable and prudent alternatives from the biological opinions. This is a serious defect, as we explained in comments on the prior draft. Reclamation's decisions to implement the reasonable and prudent alternatives without doing any NEPA review were illegal. Reclamation cannot cure its violations of NEPA by doing an analysis that assumes its past decisions to adopt the reasonable and prudent alternatives were instead lawful, which it effectively does when it rationalizes that implementing the reasonable and prudent alternatives "represents a continuation of existing policy and management direction" and therefore should be included in the No Action Alternative. (Second Admin Draft EIS at 3-3.)

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The Second Basis of Comparison in the Second Admin Draft EIS is closer to an appropriate No Action Alternative, because it does not include implementation of the reasonable and prudent alternatives. However, the Second Admin Draft EIS does not use the Second Basis of Comparison as a No Action Alternative, and disregards it in much of its NEPA analysis. The Second Basis of Comparison is "included in [the] EIS for information purposes only." (Second Admin Draft EIS at 4-1, 4-13). The document confirms that continued implementation of the

reasonable and prudent alternatives will cause huge reductions in CVP and SWP water deliveries compared to operations under the Second Basis of Comparison. (See *id.* at 5-91 – 5-94 [tables showing reduced water deliveries].) It estimates that on a long-term annual average, the reasonable and prudent alternatives will reduce CVP water deliveries by 332,000 acre-feet annually, and reduce SWP water deliveries by 773,000 acre-feet annually. (*Id.*) Yet, the Second Admin Draft EIS fails to identify even a single mitigation measure that could help mitigate these water supply impacts. Instead, it states: “Mitigation measures were not developed for reductions in surface water resources under the alternatives as compared to the Second Basis of Comparison because this analysis was included in this EIS for information purposes only.” (*Id.*, at 5-169.) This choice to not identify mitigation for the massive losses of water supply that will indisputably result from implementing the reasonable and prudent alternatives is inexplicable, and an obvious violation of NEPA. The Public Water Agencies again urge Reclamation to reconsider the definition of the No Action Alternative, because staying on the current path will not cure Reclamation’s NEPA violation.

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Second, the Second Admin Draft EIS does not allow for an easy comparison of the relative merits of the various alternatives analyzed, and the trade-offs involved in choosing one alternative over another. In its current form, it separately analyzes and summarizes the environmental consequences of each alternative for each resource category, in chapters 5 through 21. That separate treatment of resource categories may be fine for organizational purposes, but to better inform the public and policy makers the environmental impact statement should also have a section or chapter that synthesizes the overall results. The existing Chapter 3 describes each alternative considered, but it does not analyze or compare the relative environmental consequences and the trade-offs among alternatives. Table 22.1 provides a start on a comparison among alternatives, but is deficient because it does not include the Second Basis of Comparison, does not include any information regarding fish and aquatic resources, and is too brief and general to meaningfully inform decisions. Gathering up the overall consequences of each alternative and analyzing and highlighting the trade-offs involved would benefit both Reclamation and the public in understanding the choices to be made. The Second Admin Draft EIS should be revised to include an analysis and comparison among all the alternatives in a single section or chapter.

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Third, in at least some cases the Second Admin Draft EIS describes the “environmental consequences” of alternatives as differences in expected conditions without addressing the materiality of those differences. For example, Chapter 9 (regarding Fish and Aquatic Resources) describes differences in various parameters, e.g. water temperatures or flow, that are expected to result from alternative project operations. But Chapter 9 does not assess or describe the materiality of the projected differences for the populations of affected fish species. Are the differences in projected conditions material? What criteria will be used to determine whether a particular difference is material? If the expected relative benefit of a particular operation intended to protect fish populations is minimal, that information would usefully inform Reclamation’s ultimate decision on whether to adopt that measure, especially if that measure significantly impairs other project purposes. If the materiality of the differences in conditions is unknown, that absence of information should be expressly noted. A synthesis and presentation of information regarding the materiality of potential changes in operations for fish populations, or the lack of such information, would help inform the public and decision makers of the expected benefits or detriments of alternative operations.

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Fourth, the Second Admin Draft EIS is deficient because it lacks an analysis and explanation of the substantial scientific uncertainties underlying the conclusions and prescriptions in the biological opinions. (See 40 CFR § 1502.22.) The available science falls well short of dictating any particular decision or specific requirement, e.g., a particular limit on negative OMR flows for delta smelt, as essential to the continued survival of the species. As a National Research Council report explained about that OMR requirement: “there is substantial uncertainty regarding the amount of flow that should trigger a reduction in exports. In other words, the specific choice of the negative flow threshold for initiating the RPA is less clearly supported by scientific analyses. The biological benefits and the water requirements of this action are likely to be sensitive to the precise values of trigger and threshold values. There clearly is a relationship between negative OMR flows and mortality of smelt at the pumps, but the data do not permit a confident identification of the threshold values to use in the action, and they do not permit a confident assessment of the benefits to the population of the action. As a result, the implementation of this action needs to be accompanied by careful monitoring, adaptive management, and additional analyses that permit regular review and adjustment of strategies as knowledge improves.”² The Second Admin Draft EIS should be revised to acknowledge and define that gap in knowledge for decision makers, and the public. Even with the benefit of the most recent data available, Reclamation’s coming decisions will be predominantly policy choices made in the context of significant scientific uncertainty.

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Finally, the changes the Public Water Agencies recommend even in this brief comment letter will require substantial revision of the Second Admin Draft EIS, and more detailed comments during the public comment period will likely raise yet additional issues. Under the current remand schedule in the delta smelt case, Reclamation’s Record of Decision is due by December 1, 2015. That likely will not allow enough time to make needed revisions. The Public Water Agencies are open to an extension of the current remand deadline, which the court would of course have to approve. We invite further discussion with Reclamation on this issue. In the meantime, however, Reclamation should proceed with the release of the document for public comment.

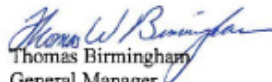
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Thank you for your consideration of these comments.

Sincerely,



Daniel G. Nelson
Executive Director
San Luis & Delta-Mendota Water Authority



Thomas Birmingham
General Manager
Westlands Water District

² National Research Council (2012). *Sustainable Water and Environmental Management in the California Bay-Delta*. Washington DC: National Academies Press, at pp. 210-211.

Appendix 1C: Comments from Regional and Local Agencies and Responses

San Luis & Delta-Mendota Water Authority



P.O. Box 2157
Los Banos, CA 93656
Phone: (209) 826-9696
Fax: (209) 826-9698

Westlands Water District



3130 N. Fresno Street
P.O. Box 6056,
Fresno, CA 93703-6056
Phone: (559) 234-1533
Fax: (559) 241-6277

May 3, 2013

BY EMAIL: BCNELSON@USBR.GOV

Mr. Ben Nelson
Bureau of Reclamation, Bay-Delta Office
801 I Street, Suite 140
Sacramento, CA 95814-2536

Re: Administrative Draft Environmental Impact Statement for the Remanded
Biological Opinions on the Coordinated Long-term Operation of the
Central Valley Project and State Water Project

Dear Mr. Nelson:

The San Luis & Delta-Mendota Water Authority and Westlands Water District (together "Public Water Agencies") appreciate the opportunity to comment in response to the United States Bureau of Reclamation's ("Reclamation") request for interested parties to review and comment on the Administrative Draft Environmental Impact Statement for the Remanded Biological Opinions on the Coordinated Long-term Operation of the Central Valley Project and State Water Project ("Draft EIS").

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The Draft EIS suffers from fundamental and serious deficiencies, and requires substantial revision to provide meaningful environmental analysis for the benefit of the public and policy makers, and comply with the requirements of the National Environmental Policy Act ("NEPA"). At least in part, the deficiencies in the Draft EIS appear to be a result of Reclamation's judgment that it could not conduct a more robust and complete analysis within the time remaining for completion of the remand in the *Consolidated Delta Smelt Cases*, originally set for December 1, 2013. On April 9, 2013, however, the federal district court granted Reclamation an extension of time to complete the remand in that case, as well as in the related *Consolidated Salmon Cases*. The court provided that, so long as Reclamation shows progress with the Collaborative Science and Adaptive Management Process and the Endangered Species Act ("ESA") consultation, the court would allow Reclamation until December 1, 2016 in the *Consolidated Delta Smelt Cases*, and until April 29, 2019 in the *Consolidated Salmon Cases* to complete NEPA review and consultations under section 7 of the ESA.

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These extensions are welcome news, and provide Reclamation the time and opportunity to make the substantial revisions necessary to bring the Draft EIS into compliance with NEPA. It is vitally important that Reclamation's decision regarding what actions it must take to meet its obligations under the ESA be informed by a sound and complete environmental impact

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statement. Such an environmental impact statement will assist Reclamation in achieving a balance between the actions Reclamation will undertake to comply with the ESA and the manner in which Reclamation will operate the Central Valley Project to meet its various purposes, including delivery of water to the Public Water Agencies.

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Given the additional time the Court has now granted Reclamation, we urge Reclamation to undertake the following actions:

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- Prepare a new Biological Assessment for the ESA consultation. A new Biological Assessment is necessary to reflect changes to project operations and new scientific data in the years since the last consultation.
- Exclude from the No Action Alternative under NEPA the major changes to project operations required by the existing biological opinions. Reclamation should do so both because many of those requirements have been invalidated, and because the environmental effects of those measures should be assessed as part of the NEPA analysis. Including the biological opinions in the No Action Alternative masks their impact, and is contrary to the district court's ruling that NEPA analysis must be completed before Reclamation may adopt those measures.
- Use NEPA review as an opportunity to better inform Reclamation's judgment about how it can meet its obligations under ESA section 7 with respect to Central Valley Project operations, including whether project operations are likely to jeopardize listed species. Assuming Reclamation concludes that changes to operations are necessary to comply with the ESA, it should explore alternatives that will minimize impacts to water supply. Reclamation should not begin its analysis by presuming that project operations jeopardize listed species, or that the existing reasonable and prudent alternatives are either necessary or efficacious.
- Consider and analyze what changes to Central Valley Project operations are necessary, as opposed to sufficient, to ensure that operations are not likely to jeopardize listed species. Reclamation should not be taking actions that reduce water supply unless those actions are necessary to meet the no-jeopardy mandate in ESA section 7.
- In the environmental impact statement, expressly acknowledge the high level of scientific uncertainty underlying the conclusions and requirements of the existing biological opinions, and factor that uncertainty into its analysis of alternatives. To the extent Reclamation proposes actions intended to benefit listed species despite that significant uncertainty, based on a precautionary approach, it should expressly acknowledge it is doing so and identify the trade-offs involved, including lost water supply and socioeconomic impacts.
- Conduct quantitative analyses of the potential impacts of each alternative. The entirely qualitative analysis in the Draft EIS is inadequate.
- Proceed concurrently with the ESA consultation and NEPA review; each process should inform the other.

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Additional and more detailed comments are attached to this letter as Exhibit B. Please note that these comments should not be considered an exhaustive list of all the defects and problems we see in the Draft EIS. Instead, this is our effort, in the limited time allowed, to identify some basic needed changes to the Draft EIS as Reclamation reconsiders its approach in light of the extension of time for completing the remand.

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Also, the Public Water Agencies previously submitted a comment letter in response to Reclamation's Notice of Intent and Scoping which provides additional explanation of the NEPA analysis Reclamation should be doing on remand. The Draft EIS is inconsistent with many of the suggestions in that letter. As Reclamation re-evaluates its approach to the environmental impact statement, it should reconsider those scoping comments. For your ease of reference, a copy of that letter is attached as Exhibit C.¹

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Finally, the Public Water Agencies hope to work in a cooperative manner with Reclamation to ensure that the final environmental impact statement addresses the significant issues that arise from potential modifications of Central Valley Project operations pursuant to the ESA, and that the environmental impact statement includes an appropriate range of alternatives and a robust and complete impact analysis.² As the ESA consultation progresses, including particularly preparation of a new biological assessment, Reclamation should be able to concurrently define a proposed action and additional alternatives to be included in its analysis. Reclamation's analysis ultimately must foster a workable, environmentally sound plan for continued operations of the Central Valley Project that protects and restores the socioeconomic vitality of, and minimizes the adverse environmental impacts in, the regions the Central Valley Project serves, while ensuring legally and scientifically supportable, reasonable, and effective protection mechanisms for the listed species.

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Thank you for your consideration of these comments.

Sincerely,



Daniel G. Nelson
Executive Director
San Luis & Delta-Mendota Water Authority



Thomas Birmingham
General Manager
Westlands Water District

¹ Exhibit C, Public Water Agencies, Comment Letter Regarding Notice of Intent and Scoping under the National Environmental Policy Act on Remanded Biological Opinions on the Coordinated Long-term Operation of the Central Valley Project and State Water Project (June 28, 2012).

² The Public Water Agencies recognize the close relationship between the NEPA process and the related ESA consultation process. As explained in the Reclamation Stakeholder Engagement Process for Section 7 ESA Consultation and NEPA Compliance on the Remanded Biological Opinions on the Coordinated Long-term Operation of the Central Valley Project and State Water Project, issued June 2, 2012 (p. 2), "Reclamation anticipates a free and complete flow of information between the NEPA and Section 7 consultation processes, with each informing the other."

EXHIBIT A

San Luis & Delta-Mendota Water Authority Member Agencies

The Authority's members are: Banta-Carbona Irrigation District; Broadview Water District; Byron Bethany Irrigation District (CVPSA); Central California Irrigation District; City of Tracy; Columbia Canal Company (a Friend); Del Puerto Water District; Eagle Field Water District; Firebaugh Canal Water District; Fresno Slough Water District; Grassland Water District; Henry Miller Reclamation District #2131; James Irrigation District; Laguna Water District; Mercy Springs Water District; Oro Loma Water District; Pacheco Water District; Pajaro Valley Water Management Agency; Panoche Water District; Patterson Irrigation District; Pleasant Valley Water District; Reclamation District 1606; San Benito County Water District; San Luis Water District; Santa Clara Valley Water District; Tranquillity Irrigation District; Turner Island Water District; West Side Irrigation District; West Stanislaus Irrigation District; Westlands Water District.

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EXHIBIT B

DETAILED COMMENTS REGARDING DRAFT EIS**I. RECLAMATION NEEDS TO REEVALUATE ITS OBLIGATIONS ON REMAND**

The NEPA review provided in the Draft EIS is inconsistent with the district court's rulings in the *Consolidated Smelt Cases* and *Consolidated Salmonid Cases* and with Reclamation's obligations on remand. In recent years, changes to project operations that purportedly were "necessary" to comply with the ESA have severely impaired the water supply function of the two projects, with disastrous consequences. Reclamation's present NEPA review should therefore be keenly focused on identifying actions it and the Department of Water Resources ("DWR") can take to better serve the water supply purposes of the projects while still meeting the requirements of the ESA. Reclamation's analysis must consider what effect the coordinated operations of the CVP and SWP actually have on species survival and recovery, what measures are proposed to reduce or compensate for such effects, what the data show about the likely efficacy of those measures, and what other effects those measures will cause including through reductions of water supply. That analysis should distinguish between actions that are necessary to comply with the mandates of the ESA (i.e., necessary to avoid jeopardy or adverse modification to critical habitat), and other actions that may provide some additional protection or benefit for listed species, but are not necessary to comply with the ESA.

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A. Reclamation And The Fisheries Agencies Must Engage In A Fundamental Reanalysis In Performing Concurrent Consultation Under The ESA And Environmental Review Under NEPA

The Draft EIS was prepared in response to rulings by the district court in the *Consolidated Delta Smelt Cases* and *Consolidated Salmonid Cases*. The court found that the existing biological opinions ("BiOps") regarding continued operation of the CVP and SWP are unlawful, and that new biological opinions are required. The court further found that Reclamation violated NEPA when it adopted and implemented major changes to project operations pursuant to those unlawful biological opinions, changes that caused significant adverse effects on the quality of the human environment, without doing any NEPA review.

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The district court ordered a remand schedule that provides for concurrent re-consultation under the ESA and environmental review under NEPA. Under the remand schedule, the FWS and the National Marine Fisheries Service ("NMFS") (collectively, "fisheries agencies") are required to provide Reclamation with new draft biological opinions, which Reclamation can then use in performing its review under NEPA. This remand schedule is intended to allow an exchange of information between Reclamation and the fisheries agencies, to assist in preparing new biological opinions consistent with the requirements of the ESA and in performing NEPA review.

During remand, Reclamation, FWS, and NMFS must engage in a fundamental reanalysis of the effect of CVP and SWP operations on the listed species, and the necessity for and efficacy of any measures intended to address such effects. Reclamation must now reconsider whether

and how the continued operations of the CVP and SWP should be modified to ensure compliance with the ESA. Before it can finally decide that issue, Reclamation must complete a new consultation under section 7 of the federal ESA regarding each listed species affected by project operations. Such consultation will require Reclamation and the California Department of Water Resources ("DWR") to prepare a new biological assessment describing the proposed CVP and SWP operations. The proposed project operations will be materially different from the operations described in the 2008 biological assessment. The new biological assessment and new biological opinions must also reflect new scientific data that have become available since 2008.

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The fisheries agencies must provide new biological opinions regarding whether project operations are likely to jeopardize the listed species, to inform Reclamation's decision as action agency regarding whether its proposed operations meet the requirements of ESA section 7. Reclamation should not have any expectation that after reconsultation the next biological opinions will necessarily be similar to the last biological opinions in their conclusions or in any measures they may impose. The Public Water Agencies submit that a scientifically rigorous analysis of the effects of CVP and SWP operations in accordance with ESA section 7 may well conclude that operations are not likely to jeopardize the listed species or adversely modify their critical habitat.

If NMFS or FWS does issue a jeopardy biological opinion, then the biological opinion must provide a Reasonable and Prudent Alternative to the proposed action, recommending modifications to project operations that are necessary to avoid jeopardy to the species. Reclamation must consider those new opinions, and as action agency make a determination of its ESA obligations. In performing these tasks, all the federal agencies should carefully consider the data and analysis of impacts and alternatives produced through the NEPA process, including new available scientific data and other changes since 2008. The task on remand is not to simply analyze the RPAs of the invalidated BiOps, but rather to analyze anew what, if any, modifications to project operations necessary to avoid jeopardy to the species. Reclamation and the fish agencies must determine if any modifications to project operations are necessary to avoid jeopardy to the species and if so, Reclamation and the fish agencies must develop a reasonable range of modifications to project operations that would avoid jeopardy and also meet the goals of continued project operations.

B. The Scope Of Reclamation's NEPA Review Necessarily Depends On The New ESA Consultation And Any Proposed Modifications To Project Operations

In the *Consolidated Delta Smelt Cases* and *Consolidated Salmonid Cases*, the district court concluded that Reclamation failed to satisfy its obligations under NEPA because it failed to analyze the environmental impacts of proposed modifications to project operations before accepting and implementing those modifications. In the *Consolidated Delta Smelt Cases*, the district court ruled that Reclamation's provisional acceptance and implementation of the 2008 Delta Smelt BiOp and its RPA constituted "major federal action" because those actions represented a significant change to the operational status quo of the coordinated operations of the CVP and SWP. (Memorandum Decision re Cross Motions for Summary Judgment on NEPA Issues (Nov. 13, 2009), Doc. 399 at 33, 42.)

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The common thread in both decisions is that Reclamation must analyze under NEPA the potential impacts of any proposal or plan to modify the longstanding and ongoing coordinated operations of the CVP and SWP before making any such changes to CVP and SWP operations pursuant to an ESA section 7 consultation. Thus, the ultimate scope of Reclamation's task under NEPA depends upon the initial outcomes of the ESA section 7 consultation among Reclamation, FWS and NMFS. If, after consultation with FWS and NMFS, Reclamation concludes that project operations will not jeopardize the listed species or adversely modify their critical habitat, then no major changes to the regime governing project operations should be required, and hence there would be no significant effects on the existing human environment triggering the need for an EIS. In that circumstance, an environmental assessment would likely suffice to meet NEPA's requirements.

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The Draft EIS states that Reclamation:

prepared this EIS as ordered by the United States District Court for the Eastern District of California (District Court). The reason given by the District Court is to evaluate potential modifications to the continued long-term operation of the CVP, in coordination with the operation of the SWP, before Reclamation accepts and implements Reasonable and Prudent Alternatives (RPAs) included in the biological opinions on long-term operation of the CVP and SWP which will be issued by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) pursuant to the Federal Endangered Species Act.

Draft EIS, at p. 1-1. The Draft EIS also states: "[t]he NEPA process analyzes the effects of modifications to the coordinated long-term operation of the CVP and SWP that are likely to avoid jeopardy to listed species and destruction or adverse modification of designated critical habitat." *Id.* at p. 1-9.

These statements misconstrue Reclamation's task on remand and also make presumptions regarding the results of the on-going section 7 consultation process. The FWS and NMFS have not made any new jeopardy determinations regarding the effects of project operations. Therefore, at this time, Reclamation, FWS, and NMFS have not yet completed the necessary analysis to evaluate the effects of project operations on listed species or to determine whether modifications to project operations are necessary to avoid jeopardy to listed species or adverse modifications to their critical habitat. Reclamation's NEPA analysis should not presume at the outset the answer to the question it is supposed to address.

C. Reclamation Should Consider How It Will Develop A Thorough And Complete Joint EIS Given The Different Remand Schedules

Reclamation must complete its ESA consultation and NEPA review by the new deadlines ordered by the district court.¹ These deadlines differ between the two cases. The respective deadlines, assuming the agencies show the progress required by the Court, are:

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¹ See *Consolidated Smelt Cases*, Docs. 1106, 884; *Consolidated Salmonid Cases*, Docs. 739, 655.

Action Item	Consolidated Delta Smelt Cases	Consolidated Salmonid Cases
Draft BiOp	Transmitted Dec. 14, 2011	Oct. 1, 2017
Draft EIS/NEPA	No deadline set by Court	Within 6 months of receiving draft BiOp
Final EIS/NEPA	Within 61 months of Dec. 14, 2011 [Jan. 14, 2017]	Feb. 1, 2019
Final BiOp	Dec. 1, 2016	Feb. 1, 2019
Record of Decision	Within 61 months of Dec. 14, 2011 [Jan. 14, 2017]	April 29, 2019

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It appears from the Draft EIS that Reclamation intends to analyze the effects of any changes to CVP and SWP operations for both the delta smelt and salmonid species in a single EIS. The Public Water Agencies acknowledge there may be benefits to performing a joint NEPA review and analysis of the impacts associated with potential project operations to protect both delta smelt and salmonid species. However, the Public Water Agencies are concerned that the differences between the two remand schedules may make it difficult for Reclamation to prepare an adequate joint EIS. Under the remand schedules set by the court in the two cases, the entire remand process related to delta smelt must be completed by January, 2017, while a draft salmonid biological opinion is not due to be completed until October 1, 2017. Hence, unless Reclamation and NMFS complete the remand required by the judgment in the *Consolidated Salmonid Cases* more quickly than the court's schedule would require, a change in schedule would likely be necessary to accommodate a combined analysis integrating all the listed species. Under no circumstances should the January 2017 deadline in the *Consolidated Smelt Cases* be relied upon as an excuse for preparing a qualitative and superficial NEPA review and analysis related to salmonids.

The remand schedules allow Reclamation, FWS, and NMFS more than adequate time to complete the full analyses required under NEPA and the ESA. The court's requirement that the agencies meet dates certain does not excuse an abbreviated, out-dated or incomplete analysis. Integration of NEPA review and ESA consultation will require "close and careful coordination and cooperation between Reclamation" and the fisheries agencies. Reclamation's NEPA Handbook (Feb. 2012) ("NEPA Handbook"), at p. 3-22.

II. THE "PROPOSED ACTION" NEEDS TO BE IDENTIFIED

The Draft EIS does not clearly identify the "proposed action." The Department of Interior's regulations for implementation of NEPA ("Interior's NEPA Regulations") define the "proposed action" as "the bureau activity under consideration" and the regulations state that the "proposed action" must be "clearly described in order to proceed with NEPA analysis." 43 C.F.R. § 46.30. Interior's NEPA Regulations mandate that an EIS include a "description of the proposed action." 43 C.F.R. § 46.415(a)(2).

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Apparently, Reclamation has not yet decided upon a proposed action. The Draft EIS states:

Concurrent with preparation of this EIS, Reclamation initiated preparation of the consultation package to be submitted to USFWS and NMFS for the remand of the USFWS BO and the NMFS BO. Information presented in this Draft EIS will be used to inform Reclamation during the development of the Proposed Action that will be submitted as part of the consultation package, which will serve as a biological assessment for the purposes of Section 7 consultation.

Draft EIS, at p. 1-10. This statement suggests that the “proposed action” has yet to be defined because it is still in “development.” Reclamation must decide upon a proposed action for the NEPA process. For example, unless and until Reclamation identifies and describes the “proposed action” it is difficult to imagine how Reclamation can develop a reasonable range of alternatives to the proposed action.

The Draft EIS describes the development of the “2013 Project Description” but fails to include the “2013 Project Description.” Draft EIS, at pp. 3-4 – 3-6. Nor does the Draft EIS otherwise describe or define the “proposed action” that is being analyzed in the Draft EIS. Under the description of “Alternative 2”, the Draft EIS states: “[t]he Notice of Intent identified a “preliminary proposed action” that would include the 2013 Project Description actions and the operational components of the RPAs in the USFWS BO and NMFS BO.” Draft EIS, at p. 3-22. It is unclear from this statement whether “Alternative 2” is considered the “proposed action.” It would be improper to include the RPAs of the invalidated BiOps in the proposed action. Reclamation does not yet know the outcome of re-consultation, and should not presume at this point that any reasonable and prudent alternatives are needed to avoid jeopardizing the continued existence of listed species or the adverse modification of designated critical habitat. Furthermore, many of the specific components of the 2008 FWS and 2009 NMFS RPAs were found unlawful, and hence are poor candidates for inclusion in a proposed action.

The Public Water Agencies submit that a scientifically rigorous analysis of the effects of CVP and SWP operations may well conclude that those operations do not jeopardize the listed species or adversely modify their critical habitat. Accordingly, the Public Water Agencies suggest that for NEPA review Reclamation define the proposed action as the continued operation of the projects, including existing, valid regulatory requirements, subject to lawful requirements of the incidental take statements in new biological opinions, without major changes to project operations imposed under the ESA. Ultimately, of course, Reclamation’s decision regarding the action necessary to meet its ESA obligations must be informed by the outcome of the pending re-consultations.

III. THE STATEMENTS OF “PURPOSE” AND “NEED” SHOULD BE REVISED

An environmental impact statement must contain a statement of “purpose and need” which briefly specifies “the underlying purpose and need to which the [lead] agency is responding in proposing the alternatives including the proposed action.” 40 C.F.R. § 1502.13. The purpose and need statement “is a critical element that sets the overall direction of the process

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and serves as an important screening criterion for determining which alternatives are reasonable.” NEPA Handbook at 8-5. This statement of purpose and need is important because it will inform the range of alternatives ultimately selected for analysis in the environmental impact statement and “[a]ll reasonable alternatives examined in detail must meet the defined purpose and need.” *Id.*

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The Department of the Interior’s NEPA regulations provide that in “some instances it may be appropriate for the bureau to describe its ‘purpose’ and its ‘need’ as distinct aspects. The ‘need’ for the action may be described as the underlying problem or opportunity to which the agency is responding with the action. The ‘purpose’ may refer to the goal or objective that the bureau is trying to achieve, and should be stated to the extent possible, in terms of desired outcomes.” 43 C.F.R. § 46.420(a)(1). The Public Water Agencies appreciate Reclamation’s efforts to develop separate “purpose” and “need” statements in the Draft EIS. However, the existing purpose and need statements should be revised, as described below.

Statement of Purpose

The Draft EIS describes the “purpose” of the action as follows:

to continue the operation of the Central Valley Project (CVP), in coordination with operation of the State Water Project (SWP), to meet the authorized purposes of the CVP and SWP in a manner that is similar to recent historical operations with certain modifications and that: [1] Is consistent with Federal Reclamation law; other Federal laws; Federal permits and licenses; State of California water rights, permits, and licenses; and contractual obligations; and [2] Avoids jeopardizing the continued existence of federally listed species and does not result in the destruction or adverse modification of designated critical habitat in accordance with the requirements of section 7(a) (2) of the Federal Endangered Species Act (ESA) and other applicable statutes.

Draft EIS, at p. 2-1.

Compliance with the ESA should not be included in the purpose of the proposed action. Instead, in the context here, providing water supply as fully as possible while still complying with the ESA gives rise to the *need* for the action. The “underlying problem” that Reclamation is responding to is the difficulty both projects have had in serving water supply and other project purposes while complying with the ESA. Here, the *purpose* of the action, the “goal or objective” expressed in terms of “desired outcomes,” should be to continue long-term operation of both the CVP and SWP in a manner that will enable Reclamation and the DWR to satisfy their contractual and other obligations to the fullest extent possible. Importantly, those obligations include optimizing water deliveries to CVP and SWP contractors up to contract amounts, to help meet the needs of 25 people and millions acres of agricultural land.²

² That obligation is typically found in Articles 11(a) and 12(a) of the CVP water service contracts.

Statement of Need

The Draft EIS describes the “need” for the action as follows:

Continued operation of the CVP is needed to provide river regulation, improvement of navigation; flood control; water supply for irrigation and domestic uses; fish and wildlife mitigation, protection, and restoration; fish and wildlife enhancement; and power generation. The CVP facilities also are operated to provide recreation benefits and in accordance with the water rights and water quality requirements adopted by the State Water Resources Control Board. *However, as was detailed in Chapter 1, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service concluded in their 2008 and 2009 biological opinions, respectively, that recent historical coordinated operation of the CVP and SWP does not comply with the requirements of section 7(a) (2) of ESA. Thus, modifications to the coordinated long-term operation of the CVP and SWP are required.* Modifications to be evaluated should be consistent with the intended purpose of the action, within the scope of the Department of the Interior, Bureau of Reclamation’s legal authority and jurisdiction, economically and technologically feasible, and in compliance with the requirements of section 7(a) (2) of ESA.

Draft EIS, at p. 2-1, italics added.

This statement of need presumes that “modifications to the coordinated long-term operation of the CVP and SWP are required,” based on the conclusions of the two biological opinions the district court found to be fundamentally defective, and which will be superseded by new biological opinions after completion of re-consultation. This is a serious and fundamental defect in the framework of the Draft EIS that renders it inadequate and unlawful. The Public Water Agencies reject any suggestion that the conclusions of the existing biological opinions regarding effects on listed species are a legitimate starting point for the NEPA process or the new consultations. Those biological opinions and their reasonable and prudent alternatives were remanded because they were not based on the best available science and were otherwise unsupportable and unjustified. Therefore, it is contrary to the court’s prior rulings for Reclamation to rely on the conclusions and analyses of the invalidated BiOps for the presumption that modifications to project operations “are required.” The impacts of project operations on protected species and whether modifications of project operations are necessary to avoid jeopardy to those species are precisely the issues that must be reevaluated on remand and Reclamation cannot properly rely on the prior conclusions of the invalidated BiOps to frame its NEPA analysis.

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**IV. THE DEVELOPMENT AND DESCRIPTION OF POTENTIAL ALTERNATIVES
NEEDS TO BE IMPROVED**

A. The “No Action Alternative” Must Be Revised

An environmental impact statement must “[i]nclude the alternative of no action.” 40 C.F.R. § 1502.14(d). According to Reclamation’s NEPA Handbook, “[n]o action” represents a projection of current conditions and reasonably foreseeable actions to the most reasonable future responses or conditions that could occur during the life of the project without any action alternatives being implemented.” NEPA Handbook at 8-8. Moreover,

[t]he no action alternative should not automatically be considered the same as the existing condition of the affected environment because reasonably foreseeable future actions may occur whether or not any of the project action alternatives are chosen. When the no action alternative is different from the existing condition, as projected into the future, the differences should be clearly defined. Differences could result from other water development projects, land use changes, municipal development, or other actions. “No action” is, therefore, often described as “the future without the project.”

Id.

The Draft EIS states:

[f]or this EIS, the No Action Alternative is based upon the continued operation of the CVP and SWP in the same manner as occurred at the time of the publication of the Notice of Intent in March 2012. Thus the No Action Alternative consists of the 2013 Project Description as modified by the RPAs in the USFWS BO and NMFS BO because Reclamation provisionally accepted the BOs in 2008 and 2009, respectively, and is implementing the RPAs; and the District Court did not stay or vacate the implementation of the BOs.

Draft EIS, at p. 3-7. This description of the no action alternative is inconsistent with the district court’s rulings regarding Reclamation’s failure to comply with NEPA, and will result in an EIS that fails to comply with law.

The Draft EIS’s no action alternative essentially pretends that the litigation that resulted in the remand never happened. The district court ruled that Reclamation violated NEPA by significantly modifying project operations to meet ESA requirements without first performing NEPA analysis of the impacts of such modifications or alternatives to such modifications. To remedy the error found by the court, Reclamation must place itself back in the position it was in before that error occurred (i.e. before provisionally adopting the BiOps without performing any NEPA analysis). Accordingly, in order to respond to the court’s ruling on remand, here the “no

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action" alternative should be defined to include operations consistent with Reclamation's and DWR's obligations and all legal requirements *except* any ESA-related requirements that involve major changes to operations. Under this definition of "no action," project operations would continue in compliance with other regulatory requirements (e.g., D-1641 as modified by applicable laws, including Wilkins Slough requirements, FERC license requirements, American River in-river flow requirements, etc.). Comparing this no action alternative to the action alternatives developed during the NEPA and ESA consultation processes will provide the most comprehensive and appropriate disclosure of the environmental impacts of the various action alternatives to comply with ESA requirements.³

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Treating the invalidated BiOps as any part of the "no action alternative" is a highly inadvisable course of action, because that would not cure the NEPA violation found by the district court. It would instead contradict the district court's ruling, because the NEPA analysis then would not measure and disclose the impacts of changes to CVP and SWP operations to comply with the ESA. And it would defeat the purpose of the no action alternative—to provide a meaningful comparative scenario with which to gauge the impacts of the action alternatives. To comply with the judgments in the *Consolidated Smelt Cases* and *Consolidated Salmonid Cases*, the no action alternative must be revised.

B. The "Second Basis Of Comparison" Needs To Be Revised

The Public Water Agencies appreciate Reclamation's efforts to provide a "Second Basis of Comparison" for comparing the environmental consequences of the alternatives, as a response to our concerns about the no action alternative. However, the true remedy is to correctly define the no action alternative in the first place. That would eliminate the need for a "second basis of comparison."

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We found the description and use of the "Second Basis Of Comparison" in the Draft EIS somewhat confusing. It is not a remedy for the defects in the no action alternative, because it still includes actions based on the invalidated BiOps. As we understand it, it does not provide a basis for comparison to project operations consistent with Reclamation's and DWR's obligations and all legal requirements *except* requirements related to the ESA.

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The Draft EIS states:

[n]umerous scoping comments requested that the No Action Alternative not include the RPAs in the USFWS BO and NMFS BO. The comments indicated that the EIS should include a "basis of comparison" for the alternatives that was similar to conditions prior to implementation of the RPAs in the USFWS BO and

³ The situation here is unlike most other circumstances where NEPA review is performed, because the CVP and SWP were constructed and operating before NEPA and the ESA were even enacted. Thus, the "no action" alternative, which usually serves as the baseline for evaluating the significance of environmental impacts of action alternatives, is more complicated. The existing projects including operations must be captured in the "no action" baseline so they are not included in the new effects of the action alternatives. For this reason, a hypothetical "no action" alternative that fails to account for current and previous operations of the projects would be an improper baseline for comparative analysis. See *American Rivers v. Federal Energy Regulatory Comm.*, 187 F.3d 1007 (9th Cir. 1999).

NMFS BO, and consistent with the 2011 Project Description. Scoping comments also indicated that a "No Action Alternative scenario" without implementation of the RPAs in the USFWS BO and NMFS BO could be used to analyze the effects of implementing the RPAs.

Because the RPAs were provisionally accepted and the No Action Alternative, by definition, represents a continuation of existing policy and management actions, the No Action Alternative must include the RPAs. However, in response to scoping comments and to provide a basis for comparison of the effects of implementation of the RPAs (per the District Court's mandate), this EIS includes a "Second Basis of Comparison" that does not include implementation of the RPAs. The Second Basis of Comparison can be used as a basis of comparison for the alternatives that do not include the RPAs. In this way, the action alternatives can be compared against both the No Action Alternative and the Second Basis of Comparison.

Draft EIS, at p. 3-21. For the reasons articulated above, the Public Water Agencies disagree that the no action alternative must include the invalidated RPAs. Instead, that would be inconsistent with the court's NEPA rulings.

If Reclamation adopts the "Second Basis Of Comparison" as its no action alternative, it should revise it to eliminate any actions taken in response to the invalidated BiOps and RPAs. The "Second Basis Of Comparison" includes the following existing "Fisheries and Aquatic Habitat Restoration Actions" that are "similar to actions identified in the RPAs for several ongoing programs:"

- Clear Creek flow management, gravel augmentation, Spring Creek Temperature Control Curtain, Clear Creek thermal stress reduction, and fisheries studies (similar to NMFS BO RPA Action I.1).
- Restore Battle Creek for winter-run and spring-run Chinook salmon and Central Valley steelhead (similar to NMFS BO RPA Action I.2).
- Funding for CVPIA Anadromous Fish Screen Program (similar to NMFS BO RPA Action I.5).
- Lower American River Flow Management, temperature management, temperature control devices in Folsom Lake and Lake Natoma, and minimization of flow fluctuation effects (similar to NMFS BO RPA Action II.1, II.2, II.3, and II.4).
- Measures to reduce the likelihood of entrainment or salvage at the Delta export facilities, modifications of the operation and infrastructure of the CVP and SWP fish collection facilities, and formation of a technical advisory team to address these issues (similar to NMFS BO RPA Action IV.3, IV.4, and IV.5).

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Draft EIS, at pp. 3-21 – 3-22. If the intent of the Second Basis Of Comparison is to provide a basis of comparison “that does not include implementation of the RPAs” then the Second Basis Of Comparison should not include actions under programs that are being implemented in response to, and in lieu of, the invalidated RPAs. Draft EIS, at p. 3-21. The purpose of the no action alternative is to inform the public and policy makers of what conditions would be like without major ESA-related restrictions on project operations. The existing Second Basis Of Comparison improperly assumes that modifications to project operations are necessary to avoid jeopardy and includes certain existing actions that are dependent on the invalidated BiOps’ jeopardy determination.

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C. The Draft EIS Inadequately Describes The Criteria Used To Select The Alternatives And Fails To Present A Reasonable Range Of Alternatives

Criteria Used To Develop And Select Alternatives

Reclamation’s NEPA Handbook recommends that presentation of alternatives begin with a “[g]eneral discussion of the basis for the selection of alternatives (linkage between underlying purpose and need for action and alternatives).” NEPA Handbook, at p. 8-7. NEPA requires that all federal agencies, to the fullest extent possible, “study, develop and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.” 42 U.S.C. § 4332(2)(E). Federal agencies must to the fullest extent possible “[u]se the NEPA process to identify and assess reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment” and to use all practicable means to “avoid or minimize any possible adverse effects of their actions upon the quality of the human environment.” 40 C.F.R. § 1500.2(e), (f). Agencies must “rigorously explore and objectively evaluate all reasonable alternatives” and explain why any alternatives were eliminated from detailed consideration. 40 C.F.R. § 1502.14. Reasonable alternatives are those that are “technically and economically practical or feasible and meet the purpose and need of the proposed action.” 43 C.F.R. § 46.420.

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“Each action alternative should address the purpose of and need for the action . . .” NEPA Handbook, at p. 8-9. Here, as discussed above, the purpose is to continue long-term operation of both the CVP and SWP in a manner that will serve the authorized purposes of the projects as fully as possible. Those purposes include supplying water to help meet the needs of 25 million people and millions acres of agricultural land. The need for the action arises from the difficulty both projects have had in serving the water supply and other purposes while complying with the ESA. Reclamation is required to rigorously explore a variety of alternatives. The alternatives should allow for adequate water deliveries and prevent significant impacts to public health and the human environment, and also explore various methods to sufficiently maintain and protect the listed species and their critical habitats.

The Draft EIS states:

[t]his EIS evaluates a range of alternatives for the coordinated long-term operation of the Central Valley Project (CVP) and the State Water Project (SWP). The alternatives were developed based upon comments received during the scoping process; review of the "2011 Project Description" submitted by Department of the Interior, Bureau of Reclamation (Reclamation) to the U.S. Fish and Wildlife Service (USFWS), as part of the consultation package and as described below; review of the 2008 USFWS Biological Opinion (USFWS BO) and the 2009 National Marine Fisheries Service (NMFS) Biological Opinion (NMFS BO) Reasonable Prudent Alternatives (RPAs); and comments received from stakeholders and interested parties on the "2011 Project Description."

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Draft EIS, at p. 3-1. This statement reveals that Reclamation has relied primarily on comments received from stakeholders and interested parties, along with the invalidated BiOps' RPAs, to develop the alternatives presented in the Draft EIS. Such an approach is inadequate. Reclamation must articulate the criteria used in developing the alternatives and provide a link between the purpose and need of the proposed action and the alternatives selected for detailed review.

The Draft EIS further describes the process employed for identifying a "reasonable range of alternatives" as follows:

The range of potential alternatives identified during the scoping process and through the review of the 2011 Project Description was compared to the purpose and need of the project and to whether the potential alternative would address one or more significant issues. As described above, due to the nature of the project to continue the coordinated long-term operation of the CVP and SWP, most of the comments addressed changes to portions of the RPAs or the 2011 Project Description and did not propose complete alternatives. Therefore, the range of potential changes was evaluated to define the reasonable range of alternatives to be evaluated in this EIS.

Draft EIS, at p. 3-7. While this statement appears to articulate the criteria employed by Reclamation in developing a "reasonable range" of alternatives, the Draft EIS fails to articulate whether and how the selected alternatives meet the purpose and need of the project. In addition, it is unacceptable for Reclamation to develop alternatives simply based on comments received because the alternatives are supposed to be developed based on a new analysis of project operations, the effects of project operations on listed species, and whether modifications to project operations are necessary. It is Reclamation's responsibility to develop such information and analysis and to develop a reasonable range of alternatives—not the responsibility of stakeholders and interested parties.

Reasonable Range Of Alternatives

The Draft EIS acknowledges that the "range of alternatives" required to be analyzed under NEPA "includes all reasonable alternatives, which must be rigorously explored and objectively evaluated." Draft EIS, at p. 3-1. The DOI adopted additional regulations which state that "[t]he range of alternatives includes those reasonable alternatives (43 CFR 46.420(b)) that meet the purpose and need of the proposed action, and address one or more significant issues (40 CFR 1501.7(a)(2-3)) related to the proposed action..." 43 C.F.R. 46.415(b). "When there are a very large number of potential alternatives, a reasonable number of alternatives covering the full spectrum of reasonable alternatives can be identified for detailed analyses in the NEPA document (43 CFR 46.420(c))." Draft EIS, at p. 3-6. Reclamation, as the lead agency for NEPA purposes, has "the ultimate responsibility to determine the appropriate range of alternatives." NEPA Handbook, at p. 8-9. "Where substantial controversy may exist concerning the range selected, the criteria used to limit the alternatives should be explicitly defined by Reclamation and logically supported." *Id.*

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The Draft EIS presents only four alternatives for "detailed" study. Draft EIS, at pp. 3-22 – 3-29.⁴ "Alternative 1" is described as "identical to the Second Basis of Comparison." *Id.* at p. 3-22. "Alternative 2" includes the 2013 Project Description, the operational components of the RPAs of the invalidated BiOps, and existing fisheries and aquatic habitat restoration actions that "are similar to actions identified in the RPAs for several ongoing programs." "Alternative 2" does not include:

actions related to ecosystem restoration (NMFS BO RPA Actions I.6 and USFWS BO RPA Action 6) in the Yolo Bypass, Cache Slough, Delta, or Suisun Marsh except as may occur under ongoing projects not related to the BOs. Alternative 2 does not include actions to reduce migratory delays or losses in Yolo Bypass (NMFS BO RPA Actions I.7), ecosystem restoration in the Stanislaus River watershed (NMFS BO RPA Actions III.2), fish passage at CVP dams (NMFS BO RPA Action V), or genetic management at Nimbus and Trinity River Fish Hatcheries (NMFS BO RPA Action II.6) (**Same as Second Basis of Comparison and Alternative 1**).

Draft EIS, at pp. 3-22 -3-23. "Alternative 3" includes the 2013 Project Description and an "Expanded Period for Water Transfers through the Delta and Increased Annual Volume of Water." *Id.* at p. 3-23. In addition, "Alternative 3" is described as including "some of the actions included in the RPAs" in the invalidated BiOps "that would not effect Delta exports[.]" such as fisheries and habitat restoration actions. *Id.* at pp. 3-23 – 3-24. "Alternative 3" also includes the following restoration actions that are not addressed in the RPAs of the invalidated BiOps:

- Fish passage from the western Delta to the San Joaquin River using trap and haul techniques.

⁴ For ease of reference, the Draft EIS's presentation of the Action Alternatives is attached hereto as Exhibit C.

- Establishment of high catch limits for bass and pike minnow.
- Acceleration of the completion of facilities to reduce nutrients discharged from wastewater treatment plants sooner than required under existing SWRCB requirements.

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Draft EIS, at p. 3-24 – 3-25. “Alternative 4” is described as providing changes “to long-term operation of the CVP and SWP that would reduce the frequency of reverse flows in the south Delta, increase Delta outflow, and reduce the amount of San Joaquin River flows diverted at the CVP and SWP south Delta intakes.” *Id.* at p. 3-25. The Draft EIS then describes how “Alternative 4” differs from the “No Action Alternative” with respect to CVP and SWP operations. *Id.* “Alternative 4” also includes the fisheries and aquatic restoration actions identified in the RPAs of the invalidated BiOps. *Id.* at p. 3-26.

These four action Alternatives do not represent a “reasonable range” of alternatives. The Draft EIS fails to explain how each of the alternatives meets the purpose and need for the action (i.e. continued project operations that avoid jeopardy and adverse habitat modification) and fails to articulate why these particular Alternatives were selected. Reclamation needs to develop a range of alternatives that meet the purpose and need for the action and that reduce one or more significant impacts as compared to the other alternatives. It is unreasonable for Reclamation to largely rely on the invalidated BiOps’ RPAs and the viewpoints of stakeholders as the primary basis for developing the range of alternatives. Cobbling and tweaking the RPAs of the invalidated BiOps will not suffice to meet Reclamation’s NEPA obligations on remand.

V. THE “QUALITATIVE” ANALYSIS OF POTENTIAL ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES IS FUNDAMENTALLY INADEQUATE

An EIS’s discussion of environmental consequences “forms the scientific and analytical basis” for comparing the environmental impacts of the proposed action and the alternatives. 40 C.F.R. § 1502.16. One of the purposes of NEPA is to ensure that “environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality.” 40 C.F.R. § 1500.1(b). An EIS must provide “full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment.” 40 C.F.R. § 1502.1. NEPA requires that all federal agencies, to the fullest extent possible, “utilize a systematic, interdisciplinary approach which will insure the integrated use of natural and social sciences” and “initiate and utilize ecological information in the planning and development of resource-oriented projects” 42 U.S.C. § 4334(2)(A), (H).

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A. The Qualitative Analysis Is Unjustified And Contrary To NEPA

The “qualitative” analysis provided in the Draft EIS fails to provide the information and analysis necessary to evaluate and compare the environmental consequences of the action alternatives. Reclamation’s NEPA Handbook states that the “impacts of each alternative should be quantified and analyzed separately in an organized and logical manner.” NEPA Handbook, at p. 8-14. The Draft EIS states: “[t]his EIS qualitatively assesses the potential impacts of changes on . . . resources which could result from implementation of each of the alternatives as compared

to the No Action Alternative and the Second Basis of Comparison.” Draft EIS, at pp. 4-2 – 4-3. Such a qualitative analysis fails to meet Reclamation’s obligations under NEPA.

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The Draft EIS’s justification for the “qualitative” analysis is as follows:

Many of the provisions of the RPAs, as set forth in the 2008 USFWS BO and the 2009 NMFS BO, or as they may be modified in the forthcoming biological opinions as required by the District Court’s remand, require further study, monitoring, further consultation, implementation of adaptive management programs, and subsequent environmental documentation for future facilities to be constructed and/or modified, as described in Chapter 3, Description of Alternatives. Because the results of these studies are not presently known, specific actions and specific responses to those actions also are not known at this time. Therefore, this EIS assumes the completion of future actions, including provisions of the RPAs, in a manner that would be consistent with ESA and does not address impacts during construction or start-up phases of these actions. The analysis of environmental consequences in this EIS is conducted in a qualitative manner with consideration of a range of probable long-term effects of the alternatives as compared to the No Action Alternative.

Draft EIS, at p. 1-9. This statement reveals that Reclamation made no effort to quantify the environmental consequences of the action alternatives, despite its obligation and ability to do so.

B. Reclamation Must Obtain The Information Necessary To Analyze The Environmental Consequences Or Disclose Any Incomplete Or Unavailable Information That Cannot Be Obtained

“The EIS analysis is not limited to readily available information. If information exists that is relevant to a potentially significant adverse impact, that information should be included in the analysis.” NEPA Handbook, at p. 8-16. Reclamation’s Handbook states “Reclamation will obtain the information necessary to fully evaluate all reasonably foreseeable, significant adverse impacts in NEPA documents, unless the information cannot be obtained because the costs are too great or the means of getting it are not available.” NEPA Handbook, at p. 3-15. It may be that despite more rigorous analysis there will still be substantial scientific uncertainty regarding the likely environmental consequences of various alternatives. When Reclamation is “evaluating the reasonably foreseeable significant adverse effects on the human environment in [the EIS] and there is incomplete or unavailable information,” it is required to “always make clear that such information is lacking.” 40 C.F.R. § 1502.22.

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The NEPA Handbook provides guidance regarding NEPA analysis in the absence of information, as follows:

When the agency is evaluating reasonably foreseeable adverse impacts, and there is incomplete or unavailable information, the

agency shall make clear that such information is lacking. Every effort should be made to collect all information essential to a reasoned choice between alternatives. If the information relevant to a reasoned choice cannot be collected because of exorbitant cost or because no means exists to gather the information (i.e., it does not exist, or there is no way to get it), the agency shall, in the EIS: [1] State that such information is incomplete or not available [2] Indicate the relevance of the incomplete or unavailable information to reasonably foreseeable adverse impacts [3] Include a summary of existing credible scientific evidence relevant to the foreseeable adverse impact [4] Include an evaluation of the reasonably foreseeable adverse impact, based upon theory or research methods generally acceptable to the scientific community[.]

NEPA Handbook, at p. 8-16.

Thus, at a bare minimum, if the relevant incomplete information “cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known,” Reclamation must include a statement in the EIS explaining the nature of such information, its relevance, a summary of existing credible scientific evidence, and Reclamation’s evaluation of potential impacts based on approaches or methods generally accepted in the scientific community. 40 C.F.R. § 1502.22(b); NEPA Handbook, at p. 3-15. The Draft EIS does not meet these requirements.

C. Reclamation Has Access To Sufficient Modeling Tools And Scientific Information To Perform A More Detailed Quantitative Analysis Of Environmental Impacts

Complete and perfect information is not necessary to perform a more detailed quantitative analysis of the environmental consequences of the action alternatives. Reclamation is obligated to try to obtain new information, and use existing information, to evaluate the environmental consequences of the action alternatives. For example, with respect to water supply impacts, Reclamation can utilize the CALSIM II model to assess the water supply impacts associated with any proposed modifications to the CVP and SWP operations. In fact, many of the RPA actions in the invalidated BiOps are already incorporated into the CALSIM II model and the current CALSIM II model could be used to simulate water supply impacts associated with those RPA actions.⁵ Reclamation must make every effort to disclose and quantify the water supply impacts associated with any project Alternatives which include modifications to project operations. This may require Reclamation to make certain assumptions regarding operational criteria, water year type, and periodic hydrology to generate information that represents the probable range of water supply impacts for a particular Alternative. However, perfect information should not be the guiding principle in seeking to disclose the likely environmental consequences of a particular action Alternative. More information to inform the public and policymakers of the choices and trade-offs among alternatives, even if it is not perfect

⁵ See Department of Water Resources, The State Water Project Reliability Report 2009 (Aug. 2010), Appendices A-1, A-2 [describing incorporation of BiOps’ RPA actions into CALSIM II model].

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information, should be the goal. A lack of perfect information is not a valid excuse for performing only a qualitative analysis.

With respect to impacts to fisheries resources, Reclamation can use existing scientific information to establish parameters for measuring ecological effects and values. The CEQ Regulations require each agency to "[i]dentify environmental effects and values in adequate detail so they can be compared to economic and technical analyses." 40 C.F.R. § 1501.2(b). For example, Reclamation could use existing scientific information to define habitat characteristics and ecological values that support fish populations and then evaluate how the project Alternatives impact those characteristics and values. The expected benefits or impacts of particular project Alternatives should then be described in detail so that they can be compared to other project Alternatives. In addition, to the extent Reclamation wishes to include Alternatives which rely on adaptive management, Interior's NEPA Regulations provide a framework for analyzing the environmental consequences of an adaptive management approach.⁶

While the impacts to water supply resources and fisheries resources are particularly important, Reclamation should reevaluate its analytical approach for assessing environmental impacts to all of the resource categories.

D. A More Detailed Quantitative Analysis Is Needed To Allow Meaningful Comparison Among Alternatives

One of the key values of an environmental impact statement is its ability to inform the public and decision-makers of the relative environmental and socioeconomic costs and benefits of each alternative, including the no action alternative. An environmental impact statement does so by including information and analyses that allow and provide a comparative assessment of the environmental impacts or benefits among these alternatives. Accordingly, the Draft EIS must provide a comparison of the benefits and/or impacts of each alternative on all the various resource categories. Because part of the purpose and need entails ESA compliance by operating the projects to avoid jeopardizing the species or adversely modifying their critical habitats, it is critical that the Draft EIS at a minimum provide analyses and descriptions for the no action alternative and the various other alternatives of the estimated increase or decrease in: (1) the numbers of individuals of each species, (2) the estimated population viability of the listed species, and (3) the amount or quality of their critical habitats. This is not an exhaustive list, and Reclamation should determine if other biological metrics would also be useful and appropriate. Because maintaining the projects' water supply reliability is a key aspect of the purpose and need, Reclamation should provide a commensurate level of analysis and detail regarding the degree to which each alternative would impair the ability of the CVP and SWP to serve their water supply functions. The alternatives analysis should allow a comparison that informs what

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⁶ The Interior's NEPA Regulations state: "Bureaus should use adaptive management, as appropriate, particularly in circumstances where long-term impacts may be uncertain and future monitoring will be needed to make adjustments in subsequent implementation decisions. The NEPA analysis conducted in the context of an adaptive management approach should identify the range of management options that may be taken in response to the results of monitoring and should analyze the effects of such options. The environmental effects of any adaptive management strategy must be evaluated in this or subsequent NEPA analysis." 43 C.F.R. § 46.145.

Appendix 1C: Comments from Regional and Local Agencies and Responses

biological benefits are expected to be gained from proposed measures, and the relative costs of such benefits to other uses of the water resources involved.

In its current form, the Draft EIS fails to provide adequate information or analysis to evaluate and compare the environmental consequences of the project Alternatives.

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EXHIBIT C

PUBLIC WATER AGENCIES' NEPA SCOPING COMMENT LETTER

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June 28, 2012

BY U.S. MAIL, FAX TO (916) 414-2439, & EMAIL TO JPINERO@USBR.GOV

Janice Piñero
Endangered Species Compliance Specialist
Bureau of Reclamation, Bay-Delta Office
801 I Street Suite 140
Sacramento, CA 95814-2536

Re: Notice of Intent and Scoping under the National Environmental Policy Act on Remanded Biological Opinions on the Coordinated Long-term Operation of the Central Valley Project and State Water Project

Dear Ms. Piñero:

The State Water Contractors ("SWC"), San Luis & Delta-Mendota Water Authority ("SLDMWA"), and Westlands Water District ("Westlands") (collectively, "Public Water Agencies") appreciate the opportunity to comment in response to the Bureau of Reclamation's ("Reclamation") notice of intent to prepare an environmental impact statement ("EIS") and notice of scoping meetings, published in the Federal Register on March 28, 2012 ("NOI").

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The NOI comes in response to rulings by the United States District Court in the *Consolidated Delta Smelt Cases* and *Consolidated Salmonid Cases*. The court found that the existing biological opinions regarding continued operation of the Central Valley Project ("CVP") and State Water Project ("SWP") are unlawful, and that new biological opinions are required. The court further found that Reclamation violated the National Environmental Policy Act ("NEPA") when it adopted and implemented major changes to project operations pursuant to those unlawful biological opinions, changes that caused significant adverse effects on the quality of the human environment, without doing any NEPA review.

Reclamation must now reconsider whether and how the continued operations of the CVP and SWP should be modified to ensure compliance with the federal Endangered Species Act ("ESA"). Before it can finally decide that issue, Reclamation must complete a new consultation under section 7 of the federal ESA regarding each listed species affected by project operations. Such consultation will require Reclamation and the California Department of Water Resources ("DWR") to prepare a new biological assessment describing the proposed CVP and SWP operations. The proposed project operations will be materially different from the operations

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described in the 2008 biological assessment. Among other changes, the description of operations must include implementation of the San Joaquin River Restoration Program, the Bay Delta Conservation Plan, and new Water Quality Objectives related to San Joaquin River flow. In addition, it should include operations allowing greater opportunities to "transfer" water through the Delta. The new biological assessment and new biological opinions must also reflect new scientific data that has become available since 2008. These data include information related to the adverse impacts caused by nutrients discharged from wastewater treatment plants, the adverse, extra-ordinary impacts of predation, the lack of identifiable adverse impact of pumping by the CVP and SWP, and the lack of identifiable adverse impact associated with changes in the location of X2 during the fall months. The changes in operations and additional scientific data will require new analyses of the effects of project operations. The Public Water Agencies submit that these new analyses should ultimately result in significantly different conclusions regarding the effects of CVP and SWP operations on listed species, and a different decision by Reclamation, than occurred in 2008 and 2009.

As far as we are aware, Reclamation has not yet prepared a biological assessment for the consultation. Reflecting the still incomplete ESA consultation process, the NOI does not define a proposed action for NEPA purposes. The NOI suggests that the proposed action may include unspecified specified "operational components" of the existing biological opinions. The proposed action should not, and presumably will not, include components of the existing opinions found to be unlawful. Since the NOI does not identify a proposed action, it logically could not and indeed does not identify any possible alternatives to such a proposed action.

Reclamation is now at the scoping stage of the NEPA process. Scoping is defined in the Council on Environmental Quality ("CEQ") regulations as "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action." 40 C.F.R. § 1501.7. Reclamation has already conducted five public scoping meetings. We appreciate Reclamation's addition of the May 22, 2012 public meeting in Los Banos, which allowed interested parties in that region an opportunity to provide direct input regarding issues that should be addressed in any EIS. Likewise we appreciate Reclamation's action in extending the deadline for written comments in response to the NOI to June 28, 2012.

As part of the scoping process, Reclamation must "[d]etermine the scope (§1508.25) and the significant issues to be analyzed in depth in the environmental impact statement." *Id.* "Scope consists of the range of actions, alternatives, and impacts to be considered in an environmental impact statement." 40 C.F.R. § 1508.25. The Public Water Agencies hope to work in a cooperative manner with Reclamation to ensure that the planned EIS addresses the significant issues that arise from potential modifications of project operations pursuant to the ESA, and that the EIS document includes an appropriate range of actions, alternatives and related impacts.¹ The incomplete and preliminary information in the NOI regarding the proposed action

¹ The Public Water Agencies also recognize the close relationship between the NEPA process and the related ESA consultation process. As explained in the Reclamation Stakeholder Engagement Process ("RSEP") for Section 7 ESA Consultation and NEPA Compliance on the Remanded Biological Opinions on the Coordinated Long-term Operation of the Central Valley Project and State Water Project, issued June 2, 2012 (p. 2), "Reclamation anticipates a free and complete flow of information between the NEPA and Section 7 consultation processes, with each informing the other."

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necessarily limits the ability of the Public Water Agencies to provide responsive scoping comments here. As the ESA consultation progresses, including particularly preparation of a new biological assessment, Reclamation should likewise be able to define a proposed action and possible alternatives to be included in its NEPA analysis. The Public Water Agencies request an opportunity to provide additional comments when and as Reclamation does so. Reclamation's NEPA analysis ultimately should help foster a workable, environmentally sound plan for continued operations of the CVP and SWP that will minimize adverse socioeconomic and environmental impacts while ensuring legally and scientifically supportable, reasonable, and effective protection mechanisms for the listed species.

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I. THE STATE WATER CONTRACTORS, SAN LUIS & DELTA-MENDOTA WATER AUTHORITY, AND WESTLANDS WATER DISTRICT

The SWC organization is a nonprofit mutual benefit corporation that represents and protects the common interests of its 27 member public agencies in the vital water supplies provided by California's SWP. Each of the member agencies of the State Water Contractors holds a contract with DWR to receive water supplies from the SWP. Collectively, the State Water Contractors' members deliver water to more than 25 million residents throughout the state and to more than 750,000 acres of agricultural lands. SWP water is served in the San Francisco Bay Area, the San Joaquin Valley and the Central Coast, and Southern California. The complete list of SWC member agencies is set forth in the attached Exhibit A.

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SLDMWA is a joint powers authority, established under California's Joint Exercise of Powers Act. Gov. Code, § 6500 *et seq.* SLDMWA is comprised of 29 member agencies, 27 of which held contractual rights to water from the federal CVP. SLDMWA member agencies have historically received up to 3,100,000 acre-feet annually of CVP water for the irrigation of highly productive farm land, primarily along the San Joaquin Valley's Westside, for municipal and industrial uses, including within California's Silicon Valley, and for publicly and privately managed wetlands situated in the Pacific Flyway. The areas served by SLDMWA's member agencies span portions of seven counties encompassing about 3,300 square miles, an area roughly the size of Rhode Island and Delaware combined. The complete list of the San Luis & Delta-Mendota Water Authority's members is set forth in the attached Exhibit A.

Westlands Water District is a member agency of SLDMWA. Westlands is a California water district formed pursuant to California Water Code sections 34000 *et seq.* Westlands holds vested contractual water rights to receive water from Reclamation, through the San Luis Unit of the CVP, for distribution and consumption within areas of Fresno and Kings Counties. Westlands' total contractual entitlement for CVP water under this contract is 1.15 million acre-feet per year. In addition, Westlands holds 43,300 acre-feet of water entitlement in the form of contract assignments from other districts including Broadview Water District, Centinella Water District, Widren Water District, and Oro Loma Water District. Most of this CVP water supply is used for irrigation. Westlands encompasses approximately 600,000 acres, including some of the most productive agricultural lands in the world.

Each of these entities, their member agencies, their customers, and others within their service areas may experience significant adverse impacts as a result of actions that may follow

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from the ongoing ESA consultations. Accordingly, the Public Water Agencies believe it is vital that they participate actively in the NEPA review process, to ensure that such the environmental and socioeconomic impacts its member agencies and customers could experience from any further water limitations are fully disclosed and analyzed, and that policy makers and the public be fully informed regarding the choices to be made.

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II. COOPERATING AGENCIES

The NOI states that Reclamation has identified State and local agencies "as potential cooperating agencies," and that it "will invite them to participate as such in the near future." In a letter dated August 19, 2011, Commissioner Mike Connor indicated that the SLDMWA and SWC will be deemed cooperating agencies for this NEPA process, with specific responsibilities to be set forth in a memorandum of understanding. In the same letter, Commissioner Connor indicated that the SLDMWA and SWC would be deemed designated non-Federal representatives in the related section 7 consultation. The SLDMWA and SWC look forward to working with Reclamation in these capacities. Including the SLDMWA and SWC in these roles will further the statutorily mandated policy of Section 2(c)(2) of the ESA, which requires federal agencies to "cooperate with State and local agencies to resolve water resource issues in concert with conservation of endangered species." 16 U.S.C. § 1531(c)(2). In addition, it may be appropriate for other local public agencies that are members of the SLDMWA or SWC to serve as cooperating agencies, including Westlands, The Metropolitan Water District of Southern California, the Kern County Water Agency, and Santa Clara Valley Water District.² Several member agencies will be contacting Reclamation regarding cooperating agency status.

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According to the CEQ's regulations, cooperating agencies, on request from the lead agency, assume responsibilities for developing information and preparing environmental analyses using the cooperating agency's funds. 40 C.F.R. § 1501.6(b)(3), (b)(5). This role is also recognized in Reclamation's NEPA Handbook (Feb. 2012) at section 8.10.2.

As recommended by Reclamation's NEPA Handbook, a Memorandum of Understanding ("MOU") should be negotiated concerning the roles of the Public Water Agencies and perhaps other agencies as cooperating agencies. We therefore request that a timely meeting be scheduled with you and/or other appropriate Reclamation representatives to clarify the scope of involvement in the environmental review as cooperating agencies.

III. RECLAMATION'S TASK ON REMAND FROM THE DISTRICT COURT

The NOI identifies and briefly describes the outcome of litigation as the reason Reclamation is now undertaking NEPA review. (See discussion under heading "II. Why We Are Taking This Action.") In order to frame the parameters of Reclamation's NEPA review, it is useful to briefly recount the district court's rulings and what they require.

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² The NOI states that the State and Federal Contractors Water Agency may be invited to participate as a cooperating agency. The SWC does not agree that SFCWA should serve as a cooperating agency.

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A. The ESA Rulings

First, with respect to the requirements of the ESA, the district court found that both the U.S. Fish and Wildlife Service ("FWS") and the National Marine Fisheries Service ("NMFS") BiOps were arbitrary, capricious, or contrary to law. These flaws were so fundamental that Reclamation should not have any expectation that after reconsideration the next biological opinions will necessarily be similar to the last biological opinions in their conclusions or in any measures they may impose. By way of example, in the *Consolidated Delta Smelt Cases*, the district court found the following errors:

- "The BiOp's reliance on analyses using raw salvage figure to set the upper and lower OMR flow limits of Actions 1, 2, and 3 was arbitrary and capricious and represents a failure to use the best available science. Actions 1, 2, and 3 depend so heavily on these flawed analyses that this failure is not harmless." *Consolidated Delta Smelt Cases*, 760 F. Supp. 2d 855, 968 (E.D. Cal. 2010).
- "Comparison of Calsim II to Dayflow model runs created potentially material bias in the BiOp's evaluation of the impacts of Project operations on the position of X2 and related conclusions regarding population dynamics and habitat. FWS's failure to address or explain this material bias represents a failure to consider and evaluate a relevant factor and violates the ESA and APA." *Id.* at 968.
- "The flawed Calsim II to Dayflow comparison fatally taints the justification provided for Action 4." *Id.* at 968.
- "The BiOp has failed to sufficiently explain why maintaining X2 at 74 km (following wet years) and 81 km (following above normal years), respectively, as opposed to any other specific location, is essential to avoid jeopardy and/or adverse modification." *Id.* at 969.
- "[T]he analyses supporting the specific flow prescriptions set forth in the RPA are fatally flawed and predominantly unsupported. The BiOp does not justify or explain its attribution to Project operations adverse impacts caused by other stressors." *Id.* at 969.
- "The BiOp completely fails to analyze economic feasibility, consistency with the purpose of the action, and consistency with the action agency's authority demanded by § 402.02. Further analysis in compliance with § 402.02 is required on remand." *Id.* at 970.

Similarly, in the *Consolidated Salmonid Cases*, the district court found, among other flaws:

- "It was clear error and inconsistent with standard practice in the field of fisheries biology for Federal Defendants to rely upon the raw salvage analyses set forth in Figures 6-65 and 6-66 to reach conclusions about the effect of specific levels of negative OMR flows on the Listed Species. None of the alternative record citations or analyses cited by Defendants, including the PTM Modeling Results, or Figures 6-71, 6-72, or 6-73, provide sufficient alternative bases for NMFS's conclusions regarding the negative OMR flows below which loss of juvenile salmonids 'increases sharply.'" *Consolidated Salmonid Cases*, 791 F. Supp. 2d 802, 955 (E.D. Cal. 2011).
- "Federal Defendants' reliance on Figure 6-71 also suffers from the same unjustified use of raw salvage data. Federal Defendants must clarify on remand whether it is possible to scale the CV steelhead data used in Figures 6-72 and 6-73 to population size and, if not,

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why unscaled analyses are nevertheless useful. Federal Defendants must also further explain and/or refine the statistical methodologies used to develop these figures." *Id.* at 955-956.

- "The record does not support the BiOp's conclusions about the connection between Project operations on the one hand and pollution and/or food limitations on the other. This is not the best available science." *Id.* at 956.
- "[T]he BiOp does not clearly explain the rationale for imposing a 4:1 ratio in above normal and wet years. Particularly in light of the potential adverse consequences of imposing such a ratio, this is unlawful." *Id.* at 957.
- "Likewise, although there is marginal record support for the imposition of some form of OMR flow restriction, Action IV.2.3 must be remanded for further explanation of the necessity for the specific flow prescriptions imposed, which are derived primarily from FTM simulations, a method that is undisputedly an imperfect, if not incompetent, predictor of salmon behavior." *Id.* at 957.
- "Action IV.3 suffers from a similar defect. Although there is record support for some form of action designed to prevent large numbers of fish from being killed or harmed at the export facilities, lawful explanation is required to justify the specific triggers imposed by Action IV.3." *Id.* at 957.
- "Federal Defendants failed to sufficiently explain whether the RPA can be implemented consistent with the co-equal, non-environmental statutory purposes of the action." *Id.* at 957.
- "[W]hile there is anecdotal evidence for some of the general approaches used in these RPA Actions, the specific prescriptions imposed are not sufficiently justified or explained. NMFS acted arbitrarily and capriciously in concluding that Actions IV.2.1, IV.2.3, and IV.3 are essential to avoid jeopardy and/or adverse modification." *Id.* at 957.

In light of these and other serious flaws in the last biological opinions, Reclamation, FWS, and NMFS must engage in a fundamental reanalysis of the effect of CVP and SWP operations on the listed species, and the necessity for and efficacy of any measures intended to address such effects. For their part, FWS and NMFS must do such reanalysis and issue new biological opinions. For its part, Reclamation must consider those new opinions, and make a determination of its ESA obligations. In performing these tasks, all the federal agencies should carefully consider the data and analysis of impacts and alternatives produced through the NEPA process.

Reclamation must prepare a new biological assessment for the new consultations. A new biological assessment is necessary both because of new scientific data and studies that have become available since 2008, and because of changes in current and planned project operations since 2008. Among other recent information, new science since 2008 includes life-cycle models, analyses of ammonium impacts on the food web, and analyses addressing the need for a "fall X2" measure. An example of changed project operations is implementation of the San Joaquin River Restoration Program, which requires the restoration of flows to the San Joaquin River Basin and the reintroduction of spring-run Chinook salmon into the San Joaquin River. Reclamation has already begun modifying the flows that reach the Delta, and reintroduction of spring-run Chinook salmon to the San Joaquin River is scheduled to begin by December 31, 2012.

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The consultation must also consider other, ongoing regulatory and permitting processes that will influence project operations and the affected environment. The BDCP is expected to provide the basis for endangered species permits for, and a biological opinion regarding, in-Delta operations of the SWP and CVP beginning in about 2025. The draft BDCP is scheduled to be released in late 2012 and finalized in 2013. Elements of the BDCP not involving CVP and SWP operations will improve conditions for listed species even before new facilities become operative in 2025. Also, the State Water Resources Control Board ("State Water Board") is in the process of revising its existing Bay-Delta Plan. This revision may include updated or new objectives (e.g. San Joaquin River flow objectives) that could impact project operations. All that and more must be considered in a new biological assessment, and in the new biological opinions.

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A final issue related to the new consultations is what period of project operations should be included in the consultation. The FWS and NMFS will issue new biological opinions for BDCP that will address in-Delta CVP and SWP beginning in 2025. Those biological opinions will then supersede the biological opinions that result from the reconsultation pursuant to the remand. Accordingly, the Public Water Agencies suggest that the reconsultation, and the related NEPA review, address project operations until in-Delta CVP and SWP operations are covered through the BDCP permits and BDCP-related biological opinions.

B. The NEPA Rulings

The district court did not direct what level of NEPA review Reclamation should undertake on remand. In the *Consolidated Delta Smelt Cases* the district court ruled that Reclamation's provisional acceptance and implementation of the 2008 Delta Smelt BiOp and its RPA constituted "major federal action" because those actions represented a significant change to the operational status quo of the coordinated operations of the CVP and SWP. (Memorandum Decision re Cross Motions for Summary Judgment on NEPA Issues (Nov. 13, 2009), Doc. 399 at 33, 42.) The court explained that the "critical inquiry" with respect to the "major federal action" issue is "whether the BiOp causes a change to the operational status quo of an existing project." (Doc. 399 at 33.) The court concluded that the "RPA will be implemented by altering flow patterns" and "implementing such management actions constitutes a new and unprecedented change in project operations, which will have restrictive impacts that have the potential to be major and adverse." (Doc. 399 at 36, fn. 13.) The court explained that "Reclamation's decision to implement the RPA is a 'revision [of] its procedures or standards' for operating the Jones pumping plant and other facilities significantly affecting OMR flows" and is therefore "major federal action because it substantially alters the status quo of the Projects' operations." (Doc. 399 at 41-42 [alteration in original].)

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The district court explained that where the "major federal action" component for triggering NEPA is met, "an agency must prepare an EIS 'where there are substantial questions about whether a project may cause degradation of the human environment.'" (Doc. 399 at 42 [quoting *Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233, 1239 (9th Cir. 2005)].) The court found it undisputed that "implementation of the RPA reduced pumping by more than 300,000 AF in the 2008-09 water year" and that such reductions in exports from the Delta may place greater demands upon alternative sources of water, including groundwater. (Doc. 399 at

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43.) The court also found the “potential environmental impact of groundwater overdraft is beyond reasonable dispute.” (*Id.*) The court concluded that this, in and of itself, “raises the kind of ‘serious questions’ about whether a project may cause significant degradation of the human environment, requiring NEPA compliance.” (Doc. 399 at 44.) The court therefore held that Reclamation must comply with NEPA and that “NEPA applies to Reclamation’s acceptance and implementation of the BiOp and its RPA.” (*Id.*)

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The district court’s summary judgment ruling on the NEPA issue in the *Consolidated Salmonid Cases* relied heavily on the analysis contained in the *Consolidated Delta Smelt Cases* NEPA ruling. *Consol. Salmonid Cases*, 688 F. Supp. 2d 1013 (E.D. Cal. 2010). The district court concluded that “Reclamation’s operation of the projects to comply with the 2009 Salmonid BiOp RPAs is major federal action under NEPA.” *Id.* at 1024. The court concluded that “implementation of the 2009 Salmonid BiOp is not a continuation of the status quo” and “implementation of the RPA constitutes a non-trivial ‘revision of procedures or standards’ for the operation of the Projects with draconian consequences.” *Id.* at 1031, 1032. The court concluded that at the very least, the OMR Flow Restrictions in the RPA constituted “a significant revision to Reclamation’s procedures and standards for operating the CVP.” *Id.* at 1033. The court found that “it is hard to imagine more significant adverse effect to the human environment than were effectuated by implementation of the RPAs.” *Id.* at 1032. The court found that it was undisputed that “the RPA will materially reduce water exports by 5-7 percent, or approximately 330,000 AF” and concluded that it was beyond dispute “that such reductions have the potential to significantly effect the human environment . . .” *Id.* at 1032. The court therefore concluded that there was no dispute that “‘there are substantial questions’ about whether coordinated operation of the CVP and SWP under the RPAs ‘may cause significant degradation of the human environment’” and that “[n]o more is required to trigger NEPA.” *Id.* at 1034.

The common thread in both decisions is that Reclamation must analyze under NEPA the potential impacts of any proposal or plan to modify the longstanding and ongoing coordinated operations of the CVP and SWP before making any such changes to CVP and SWP operations pursuant to an ESA section 7 consultation. Thus, the ultimate scope of Reclamation’s task under NEPA depends upon the outcome of the ESA section 7 consultation among Reclamation, FWS and NMFS. If after consultation with FWS and NMFS Reclamation concludes that project operations will not jeopardize the listed species or adversely modify their critical habitat, then no major changes to the regime governing project operations should be required, and hence there would be no significant effects on the existing human environment triggering the need for an EIS. In that circumstance, an environmental assessment would likely suffice to meet NEPA’s requirements. The NOI indicates that Reclamation has decided to prepare an EIS. That is a discretionary choice NEPA allows, even if upon further analysis the likely environmental impacts are revealed to be minor. Our point here is only that if there are no major changes to CVP and SWP operations, then an EIS likely would not be required.

On the other hand, if the new consultation results in a finding of jeopardizing effect or adverse modification of critical habitat, then Reclamation must consider what reasonable and prudent alternatives (“RPAs”) to proposed operations are both necessary and efficacious. If Reclamation concludes that major changes to project operations will be required in order to avoid jeopardizing listed species or adversely modifying their critical habitat, then the scope of

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Reclamation's task to meet NEPA's requirements will increase substantially.³ The major changes to CVP and SWP operations required by the RPAs in the last biological opinions, for example, resulted in devastating adverse environmental and socioeconomic impacts within the project service areas, including particularly within the west side of the San Joaquin valley. Under the district court's ruling, Reclamation would then be duty bound to consider the impacts from changes in project operations on the quality of the human environment, as well as alternatives that may lessen those impacts while still meeting the requirements of the ESA. That will require an EIS.

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Although the ultimate scope of the required NEPA review will vary depending upon what changes to project operations, if any, Reclamation decides are needed to meet its obligation under ESA section 7, the NEPA and ESA processes may and should proceed concurrently. See 40 C.F.R. § 1502.25(a); 50 C.F.R. § 402.06; NEPA Handbook at 3-21 – 3-23. Based on the NOI, it appears that Reclamation agrees that it may and should begin its NEPA process well before the section 7 consultation is completed. Information developed in the NEPA process should inform and improve the ESA consultations. Likewise, information developed during ESA consultation should be considered for the NEPA process.

C. Deadlines For Completing Remand

Reclamation must complete its ESA consultation and NEPA review by deadlines ordered by the district court. These deadlines differ between the two cases. The respective deadlines are:

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	<i>Consolidated Delta Smelt Cases</i>	<i>Consolidated Salmonid Cases</i>
Draft BiOp	Oct. 1, 2011	Oct. 1, 2014
Draft EIS		April 1, 2015
Final EIS	Nov. 1, 2013 (Within 25-months of receiving draft BiOp / RPA)	Feb. 1, 2016
Final BiOp	Dec. 1, 2013	Feb. 1, 2016
Record of Decision		April 29, 2016

These dates were set by the court after consideration of representations by the federal agencies regarding how much time they needed to complete each consultation and related NEPA review.

It appears from the NOI that Reclamation may intend to analyze in a single EIS the effects of any changes to CVP and SWP operations for both the delta smelt and salmonid species. Under the remand schedules set by the court in the two cases, the entire remand process related to delta smelt must be completed by December 1, 2013, while even a draft salmonid biological opinion is not due to be completed until October 1, 2014. Hence, unless Reclamation and NMFS complete the remand required by the judgment in the *Consolidated Salmonid Cases*

³ We do not address here the obligations of FWS and NMFS under NEPA, as the NOI relates solely to Reclamation's intention to prepare an EIS. The obligations of FWS and NMFS with respect to the existing biological opinions are the subject of ongoing litigation in the Ninth Circuit, and nothing in or absent from this letter should be construed as a waiver of any position regarding the NEPA obligations of those agencies.

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much more quickly than the court's schedule would require, a change in schedule will be necessary to accommodate a combined analysis integrating all the listed species. Depending upon further clarification and discussions with Reclamation, FWS, and NMFS, the Public Water Agencies would consider supporting a change in the remand schedules if reasonably necessary for the purpose of allowing an integrated analysis covering all the listed species.

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The existing separate remand schedules allow Reclamation, FWS, and NMFS more than adequate time to complete the full analyses required under NEPA and the ESA separately. The court's requirement that the agencies meet dates certain does not excuse an abbreviated, outdated or incomplete analysis. However, if the federal agencies now believe that either existing schedule would preclude them from doing such full analysis, then the Public Water Agencies are open to discussions with them regarding potential adjustments. Again depending upon further discussions with the federal agencies, the Public Water Agencies would consider supporting an extension of time if and to the extent necessary to do the full analyses required by the ESA and NEPA.

IV. NEPA'S REQUIREMENTS

NEPA has a number of requirements that must be carefully followed in order to be legally compliant with the statute and implementing regulations. We address several of these obligations below, in response to the limited information provided in the NOI. As Reclamation decides upon and reveals more about its intended NEPA review, we will likely have additional comments to provide.

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A. Purpose And Need

An EIS must contain a statement of "purpose and need" which briefly specifies "the underlying purpose and need to which the [lead] agency is responding in proposing the alternatives including the proposed action." 40 C.F.R. § 1502.13. The purpose and need statement "is a critical element that sets the overall direction of the process and serves as an important screening criterion for determining which alternatives are reasonable." NEPA Handbook at 8-5. This purpose and need are important because they will inform the range of alternatives ultimately selected for analysis in the EIS and "[a]ll reasonable alternatives examined in detail must meet the defined purpose and need." *Id.*

The Department of the Interior's NEPA regulations provide that in "some instances it may be appropriate for the bureau to describe its 'purpose' and its 'need' as distinct aspects. The 'need' for the action may be described as the underlying problem or opportunity to which the agency is responding with the action. The 'purpose' may refer to the goal or objective that the bureau is trying to achieve, and should be stated to the extent possible, in terms of desired outcomes." 43 C.F.R. § 46.420(a)(1).

The NOI states that the "purpose" of the action "is to continue operations of the CVP, in coordination with the SWP, as described in the 2008 Biological Assessment (as modified) to meet its authorized purposes, in a manner that: [1] [i]s consistent with Federal Reclamation law, applicable statutes, previous agreements and permits, and contractual obligations; [2] [a]voids

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jeopardizing the continued existence of federally listed species; and [3] [d]oes not result in destruction or adverse modification of designated critical habitat.” 77 Fed. Reg. at 18859. Regarding “need,” the NOI mentions only the CVP, stating that continued operation of the CVP is “needed” to “provide flood control, water supply, fish and wildlife restoration and enhancement, and power generation. It also provides navigation, recreation, and water quality benefits.” *Id.* The NOI then goes on to observe, however, that coordinated project operations were “found to likely jeopardize the continued existence of listed species and adversely modify critical habitat. *Id.* This is an apparent reference to the conclusions of the two biological opinions the district court found to be fundamentally defective, and which will be superseded by new biological opinions after completion of reconsultation.

The Public Water Agencies believe that in this case, the *purpose* of the action and the *need* for the action are distinct—and, the EIS should reflect that difference. Here, the *purpose* of the action, the “goal or objective” expressed in terms of “desired outcomes,” should be to continue long-term operation of both the CVP and SWP in a manner that will enable Reclamation and the DWR to satisfy their contractual and other obligations to the fullest extent possible. Importantly, those obligations include optimizing water deliveries to CVP and SWP contractors up to contract amounts, to help meet the needs of 25 million people and 2 million acres of agricultural land.⁴ With population growth, the demands on CVP and SWP supplies will likely increase over time.

Compliance with the ESA should not be included in the purpose of the proposed action. Instead, in the context here, providing water supply as fully as possible while still complying with the ESA gives rise to the *need* for the action. The “underlying problem” that Reclamation is responding to is the difficulty both projects have had in serving water supply and other project purposes while complying with the ESA. In recent years, changes to project operations that purportedly were necessary to comply with the ESA have severely impaired the water supply function of the two projects, with disastrous consequences. Reclamation’s present NEPA review should therefore be keenly focused on identifying actions it and DWR can take to better serve the water supply purposes of the projects while still meeting the requirements of the ESA. Reclamation’s analysis must consider what effect the coordinated operations of the CVP and SWP actually have on species survival and recovery, what measures are proposed to reduce or compensate for such effects, what the data show about the likely efficacy of those measures, and what other effects those measures will cause including through reductions of water supply. That analysis should distinguish between actions that are necessary to comply with the mandates of the ESA, and other actions that may provide some additional protection or benefit for listed species, but are not necessary to comply with the ESA. The statement of purpose and need should make clear that an action alternative under which operations will comply with the ESA with minimal water supply impacts would be deemed superior to an action alternative under which operations will comply with the ESA but cause substantial water supply impacts. The Public Water Agencies’ definition of the purpose and need does so, and will help Reclamation to appropriately focus the proposed action and range of alternatives to be considered in the EIS.

⁴ That obligation is typically found in Articles 11(a) and 12(a) of the CVP water service contracts. It is found in Articles 6(b), 6(c) and 16(b) of the standard SWP contract.

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Two statements in the NOI's purpose and need section require additional comment. First, the text states that the purpose of the action is to continue project operations "as described in the 2008 Biological Assessment (as modified)." As stated elsewhere in this letter and in other correspondence with Reclamation, Reclamation must prepare a new biological assessment. We therefore disagree with the NOI to the extent that it implies that no new biological assessment is necessary. Furthermore, DWR and the Public Water Agencies should be permitted to directly and actively participate in the preparation of the biological assessment. Second, as stated elsewhere in this letter and other correspondence, the Public Water Agencies reject any suggestion that the conclusions of the existing biological opinions regarding effects on listed species are a legitimate starting point for the NEPA process or the new consultations. As demonstrated above, those biological opinions and their reasonable and prudent alternatives were remanded because they were not based on the best available science and were otherwise unsupportable and unjustified.

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B. Affected Environment

To fulfill its NEPA duties, Reclamation must also provide a description of the affected environment. Reclamation is required to "succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration." 40 C.F.R. § 1502.5. This discussion should include "a general description of the physical environment of the project area and a map defining the project area, the associated ecosystem(s), and the affected environment." NEPA Handbook at 8-13. This general description "should include not only the physical setting for the project, but it should describe those features—geographic, cultural, recreational, or unique or significant wildlife or vegetation—that distinguish the affected area from other areas." *Id.* The condition of the affected environment includes the presence of a suite of stressors other than project operations that affect listed species. It also includes conditions within the service areas that are dependent upon water deliveries from the CVP and SWP.

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The NOI does not use the term "affected environment." Under the heading "V. Project Area" the NOI states that "[t]he project area includes the CVP and SWP Service Areas and facilities, as described in this section." 77 Fed. Reg. at 18859. We agree that the directly affected environment includes all of the CVP and SWP service areas, as well as the areas where CVP and SWP facilities are located. The service area and project facilities include much of California. To describe the affected environment, the EIS must go further and include a general description of the physical environment within the service areas. 40 C.F.R. § 1502.15. The affected environment should include the area of and conditions within the Delta, and the Sacramento and San Joaquin river watersheds. The affected environment will encompass areas extending beyond the CVP and SWP service areas as well. For example, reductions in water supplies exported from the Delta may increase demands on Colorado River water as an alternative supply for Southern California. Identifying the direct and indirect effects of restrictions on CVP and SWP operations therefore requires consideration of conditions in a broad geographic region.

Accurately defining the extent and present condition of the affected environment is important to the analysis of environmental consequences. "The general description constitutes a basis from which specific environmental effects can be assessed." NEPA Handbook at 8-13. As

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the NEPA Handbook further explains: "If available, the historic changes and trends affecting a resource or feature, up to and including present conditions, should be described to set the stage for the projection of future changes and trends concerning the resource or feature." *Id.* In particular, there are many historic and existing factors and conditions that affect the survival and recovery of listed species, factors that are unrelated to the operations of the projects (e.g., loss of habitat, upstream water use and diversions by other water users, alterations in land uses, municipal and industrial discharges, exotic species etc.). Those factors and conditions should be carefully described as part of the affected environment so that the effects of future project operations are considered in the appropriate context. While the historic changes in the Delta and throughout the area of analysis have occurred and may be identified to "set the stage," the impacts analysis must not attempt to attribute these past changes and existing impacts to any action alternative. Instead, an accurate and complete description of existing conditions is essential because the effects of the "no action" alternative are measured against the *existing* affected environment (e.g., not the environment that existed before the project's began operations).

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C. No Action Alternative

An EIS⁵ must "[i]nclude the alternative of no action." 40 C.F.R. § 1502.14(d). From the NOI, it does not appear that Reclamation has yet defined the no action alternative. "Because the no action alternative is the basis to which all other alternatives are compared, it should be presented first, so the reader can easily compare the other alternatives to it." NEPA Handbook at 8-8. According to Reclamation's NEPA Handbook, "[n]o action" represents a projection of current conditions and reasonably foreseeable actions to the most reasonable future responses or conditions that could occur during the life of the project without any action alternatives being implemented." (*Id.*) Moreover,

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[t]he no action alternative should not automatically be considered the same as the existing condition of the affected environment because reasonably foreseeable future actions may occur whether or not any of the project action alternatives are chosen. When the no action alternative is different from the existing condition, as projected into the future, the differences should be clearly defined. Differences could result from other water development projects, land use changes, municipal development, or other actions. "No action" is, therefore, often described as "the future without the project."

NEPA Handbook at 8-8.

In an EIS, the action alternatives are compared to the no action alternative to measure the impacts of each action alternative. *See, e.g., Center for Biological Diversity v. U.S. Dept. of the Interior*, 623 F.3d 633, 642, (9th Cir. 2010) ("A no action alternative in an EIS allows

⁵ Discussion of the requirements of an EIS accepts Reclamation's apparent assumption that an EIS will be required, although that is not a foregone conclusion. As described above, the scope of the required NEPA review will depend upon what actions Reclamation decides are necessary to meet its obligations under the ESA.

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policymakers and the public to compare the environmental consequences of the status quo to the consequences of the proposed action. The no action alternative is meant to 'provide a baseline against which the action alternative[]'...is evaluated. *Id.* A no action alternative must be considered in every EIS. See 40 C.F.R. § 1502.14(d)."). The district court ruled that Reclamation violated NEPA by significantly modifying project operations to meet ESA requirements without performing any NEPA analysis of the impacts of such modifications or alternatives to such modifications. Accordingly, in order to respond to this ruling on remand, here the "no action" alternative should be defined to include operations consistent with Reclamation's and DWR's obligations and all legal requirements *except* the requirements of the ESA. Under this definition of "no action," project operations would continue in compliance with other regulatory requirements (e.g., D-1641 as modified by applicable laws, including Wilkins Slough requirements, FERC license requirements, American River in-river flow requirements, etc.). Comparing this no action alternative to the action alternatives developed during the NEPA and ESA consultation process will provide the most comprehensive and appropriate disclosure of the environmental impacts of the various action alternatives to comply with ESA requirements.⁶

When Reclamation defines the no action alternative, it should not include implementation of the RPAs in the 2008 FWS and 2009 NMFS BiOps in the no action alternative. That would contradict the district court's ruling, because the NEPA analysis then would not measure and disclose the impacts of changes to CVP and SWP operations to comply with the ESA. It would defeat the purpose of the no action alternative—to provide a meaningful comparative scenario with which to gauge the impacts of the action alternatives. As the Ninth Circuit observed in a similar context, "[a] no action alternative in an EIS is meaningless if it assumes the existence of the very plan being proposed." *Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1038 (9th Cir. 2008).

Appropriately defining the consequences of "no action" will require analysis not done in the previous ESA consultation. The record shows that the conclusions in the existing biological opinions that absent major changes project operations would jeopardize listed species and adversely modify critical habitat were not grounded on rigorous scientific analysis. For example, neither biological opinion employed the standard tool of life cycle modeling to test the significance of the effects of project operations, and other stressors, on the abundance of the listed species. While there is no question that project operations have some effect on individual members of the species through take at the export pumps, the significance of that effect on the overall population was not critically examined. It was instead largely presumed in the existing biological opinions. Further, as the district court found, the biological opinions attributed other adverse effects in the existing environment such as contaminants to project operations based only on speculation and surmise. The absence of sound scientific analysis to support the jeopardizing

⁶ The situation here is unlike most other circumstances where NEPA review is performed, because the CVP and SWP were constructed and operating before NEPA and the ESA were even enacted. Thus, the "no action" alternative, which usually serves as the baseline for evaluating the significance of environmental impacts of action alternatives, is more complicated. The existing projects including operations must be captured in the "no action" baseline so they are not included in the new effects of the action alternatives. For this reason, a hypothetical "no action" alternative that fails to account for current and previous operations of the projects would be an improper baseline for comparative analysis. See *American Rivers v. Federal Energy Regulatory Comm.*, 187 F.3d 1007 (9th Cir. 1999).

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conclusions in the existing biological opinions completely undermines the validity of the specific prescriptions they imposed on project operations to remove that supposed jeopardizing effect. Furthermore, as described above, project operations have changed since 2008, and there are other regulatory processes that are underway that may further alter project operations in the coming years, regardless of whether any action is taken to modify project operations pursuant to section 7 of the ESA.

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In the EIS, Reclamation must compare the environmental consequences of the no action alternative to the environmental consequences of the action alternatives. With respect to consequences for listed species, that comparison should measure and disclose how many more fish are expected to survive and reproduce under one scenario as opposed to another. For example, if reverse flows in Old and Middle rivers are limited by other existing non-ESA regulations but not by additional measures under the ESA, what are the expected effects on population abundance? If additional restrictions on such flows are imposed under the ESA, what is the expected effect on abundance of listed species? Do other measures that do not involve restrictions on project operations, such as habitat restoration, offer greater promise of improving abundance? The results of these analyses may then be considered together with the other environmental consequences associated with various alternatives, including consequences related to differences in water supply. Such a comparison is essential to inform policymakers and the public regarding the choices to be made.

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It may be that despite more rigorous analysis than has been done before there will still be substantial scientific uncertainty regarding the likely environmental consequences of various alternatives. If so, that uncertainty should be expressly acknowledged. 40 C.F.R. § 1502.22. That, too, is important information for policymakers and the public. The existing biological opinions included specific prescriptions that were initially presented as if they were required by available science, but on closer examination were found to be based only on personal judgments. The -5,000 cfs limitation on Old and Middle river flows in the 2009 Salmonid BiOp is one example. The NEPA process here should make clear the differences between what is known based on the best available science, and where the appropriate decision makers must make policy judgments in the face of uncertainty.

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D. Proposed Action

Under the CEQ regulations, a notice of intent is supposed to briefly describe "the proposed action and possible alternatives." 40 C.F.R. § 1508.22. As discussed above, the NOI does not clearly identify a proposed action, nor any possible alternatives. Indeed, from the NOI it appears Reclamation has not yet decided upon a proposed action, or identified possible alternatives to the proposed action. This apparently reflects the still preliminary and incomplete ESA consultation. The NOI states only that "[t]he proposed action for the purposes of NEPA will consider operational components of the 2008 USFWS and the 2009 NMFS Reasonable and Prudent Alternatives." 77 Fed. Reg. at 18860.⁷ But the NOI does not specifically identify which

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⁷ An alternative, possible interpretation of this statement in the NOI is that Reclamation, FWS and NMFS have already decided they will again implement the reasonable and prudent alternatives in the existing biological opinions, and intend to do only perfunctory NEPA analysis and ESA section 7 consultation. That approach would violate NEPA and the ESA, and raise serious issues regarding compliance with the district court's orders. The

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of the “operational components” from those biological opinions Reclamation has in mind, except that it will “analyze” “flow management actions” “resulting from” those biological opinions. The NOI does not identify possible alternatives to those components at all. The lack of specific information in the NOI regarding the proposed action and possible alternatives limits the ability of the Public Water Agencies to provide responsive comments here. When and if Reclamation provides specific information on those topics, the Public Water Agencies request that Reclamation provide them an opportunity to provide additional comment.

The NEPA Handbook provides that “[t]he proposed action should be defined in terms of the Federal decision to be made. When the proposed action is related to other actions—especially other Federal actions—a careful consideration of the independent value of the proposed action should be made. When the independence of the proposed action is not clear, it may be appropriate to expand the scope to include those other actions.” NEPA Handbook at 8-6. Reclamation’s decision regarding what it must do to comply with the ESA is closely related to the actions of FWS and NMFS in issuing new biological opinions regarding the effects of project operations on listed species. As a number of the Public Water Agencies have contended in the litigation, FWS and NMFS have a role and NEPA obligations here as well. Reclamation should at least consider defining the relevant Federal action subject to NEPA review to include the actions of FWS and NMFS in issuing the new biological opinions, as well as any role they reserve for themselves in implementing any measures imposed in the new biological opinions.

Components of the flawed existing biological opinions should not be included as part of the proposed action. First, Reclamation does not yet know the outcome of reconsultation, and should not presume at this point that *any* reasonable and prudent alternatives are needed to avoid jeopardizing the continued existence of listed species or the adverse modification of designated critical habitat. Furthermore, many of the specific components of the 2008 FWS and 2009 NMFS RPAs were found unlawful, and hence are poor candidates for inclusion in a proposed action. *See* Section III.D, below (discussing rejected RPA components). It may be appropriate to include some elements of the RPAs in the existing BiOps in potential alternatives for discussion and analysis, but the arbitrary and illegal nature of those measures would provide a sound basis for rejecting them. The NOI states that the “proposed action will not consider” alternatives “that would require future studies.” However, NEPA requires new studies where the available information is incomplete, unless the agency can make specific findings of exorbitant cost and infeasibility. 40 C.F.R. § 1502.22.

The Public Water Agencies submit that a scientifically rigorous analysis of the effects of CVP and SWP operations would likely conclude that those operations do not jeopardize the listed species or adversely modify their critical habitat. Accordingly, the Public Water Agencies suggest that for NEPA review Reclamation define the proposed action as the continued operation of the projects, including existing valid regulatory requirements, subject to lawful requirements of the incidental take statements in new biological opinions, without major changes to project operations imposed under the ESA. That proposed action, measured in comparison to the no action alternative, should have only modest environmental impacts. That proposed action would also meet the purpose and need described above. Ultimately, of course, Reclamation’s decision

comments in this letter presume that the federal agencies intend to follow the law and the court’s orders, and these comments are intended to assist them in doing so.

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regarding the action necessary to meet its ESA obligations must be informed by the outcome of the pending consultations.

E. Action Alternatives

The Public Water Agencies are also concerned about the type and range of alternatives that will be analyzed in the EIS(s). The alternatives analysis is the "linchpin" of an EIS. *Monroe County Conservation Council, Inc. v. Volpe*, 472 F.2d 693, 697 (2d Cir. 1972). In the alternatives analysis, federal agencies must "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. §§ 4332(2)(E); 4332(2)(C)(iii). Agencies must "rigorously explore and objectively evaluate all reasonable alternatives" and explain why any alternatives were eliminated from detailed consideration. 40 C.F.R. § 1502.14. Reasonable alternatives are those that are "technically and economically practical or feasible and meet the purpose and need of the proposed action." 43 C.F.R. § 46.420.

According to its own policies, Reclamation must develop and assess appropriate and reasonable alternatives for actions that may significantly affect the environment, integrate the Endangered Species Act into its analyses, and use the best available environmental data, including acquiring additional appropriate and reasonable data to support its decisionmaking. Reclamation Manual Policy No. ENV F03 (1998) available at <http://www.usbr.gov/recman/env/env-p03.pdf>, last visited April 9, 2012. Determining which alternatives are to be considered and analyzed is vitally important in shaping the EIS, and the scope of alternatives is directly related to the underlying purpose and need for which the action is being proposed. 40 C.F.R. § 1502.13. It is the purpose and need for the proposed action that dictates what alternatives should be developed for analysis. See *League of Wilderness Defenders-Blue Mountain Diversity Project v. Bosworth*, 383 F. Supp. 2d 1285 (D. Cr. 2005). The Department of Interior's Regulations for Implementation of NEPA explain that "[t]he range of alternatives includes those reasonable alternatives that meet the purpose and need of the proposed action, and address one or more significant issues related to the proposed action." 43 C.F.R. § 46.415.

Here, as discussed above, the purpose is to continue long-term operation of both the CVP and SWP in a manner that will serve the authorized purposes of the projects as fully as possible. Those purposes include supplying water to help meet the needs of 25 million people and 2 million acres of agricultural land. The need for the action arises from the difficulty both projects have had in serving the water supply and other purposes while complying with the ESA. The NOI appears focused on flow-related changes to project operations as the proposed action to be considered in the NEPA process. The Public Water Agencies urge Reclamation to consider measures that may benefit the survival and recovery of listed species that do not involve modifications to project operations. These alternative actions must be explored to ascertain whether any would serve the purpose and need by maintaining or benefitting populations of listed species while at the same time allowing adequate and reliable water supplies to be delivered by the CVP and SWP.

There have been numerous scientific developments since the BiOps and their RPAs were issued and overturned by court order. This new scientific understanding of the various stressors

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and means to alleviate their impacts on listed species must be evaluated as part of the best available environmental data for developing alternatives. Attached hereto as Exhibit B is a list of some of the recent scientific articles issued since the 2009 BiOp was released. These new data relate to NEPA's obligation to examine and fully analyze potential alternative actions, as well as to the ESA's requirement that the best available science be used.

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Reclamation is required to rigorously explore a variety of alternatives. As stated, the alternatives should allow for adequate water deliveries and prevent significant impacts to public health and the human environment, and also explore various methods to sufficiently maintain and protect the listed species and their critical habitats. Thus, alternatives that simply focus on flow regimes or decreasing water exports would be inappropriately narrow. As the district court previously recognized, the RPAs in the remanded BiOps had serious failings, including whether their implementation led to a wasting of water supplies without providing measurable benefit to the species.

If the RPAs in the BiOps are going to be considered as alternatives in the process—an action the Public Water Agencies believe is flawed given the court's prior rejection of the RPAs—the environmental impacts associated with implementing those measures must be fully analyzed. The Public Water Agencies believe the better approach is for the new NEPA process to affirmatively recognize that many portions of the RPAs adopted in the prior BiOps were found to be fatally flawed and to not attempt to ignore the findings of the court by including the RPAs in the environmental analysis regardless of the court's determination. For example, in its decision to remand the FWS BiOp, the district court rejected, among other components of the delta smelt BiOp RPA, its regulation of Old and Middle River ("OMR") flows and setting a range of new OMR flow prescriptions in the RPA based on raw salvage values. Similarly, the court rejected the RPA's regulation of the location of fall X2 in above-average and wet water years due, among other reasons, to the misuse of DAYFLOW data with Calsim modeling output when setting the X2 location prescriptions. The court also rejected the BiOp's conclusions regarding indirect effects. MSJ Decision, *Delta Smelt Consolidated Cases* at pp. 219-25 (Dec. 14, 2010). Further, the court criticized the BiOp's failure to "justify or explain its attribution to Project operations adverse impacts caused by other stressors . . . [requiring] further consideration and explanation." *Id.* at p. 223.

NMFS's imposition of an RPA in the Salmonid BiOp was also fatally flawed, according to the district court. For example, the court rejected the RPA's flawed use of raw salvage for regulating OMR flows; criticized NMFS's "chronic and unsatisfactorily explained failure" to use lifecycle modeling approaches and its "inexplicable" management approach without considering aspects of its lifecycle that are impacted by ocean conditions and ocean harvest; rejected the RPA's imposition of a 4:1 San Joaquin River inflow-export ratio in RPA Action IV.2.1, the specific OMR flow prescriptions in Action IV.2.3, and the triggers imposed by Action IV.3. MSJ Decision, *Consolidated Salmonid Cases* at pp. 270-75 (Sept. 20, 2011). The court specifically noted that questionable and equivocal evidence supporting agency decisions to impose significant adverse consequences on the state's water supply should "not drive the formulation of an RPA." *Id.* at pp. 272-73.

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It follows from the above discussion that serious consideration should be given to discarding the old RPA actions altogether and replacing them with alternative actions that will both benefit listed species and reduce impacts to water exports. When selecting a range of alternatives for the new EIS, Reclamation should strongly consider alternatives that will reduce impacts to water exports, rely upon the best available science, and provide measurable and tangible benefits to the listed species.

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Reclamation is required to consider "potentially reasonable alternatives beyond its own jurisdiction" and to consider "the jurisdictions of other agencies (Federal and otherwise) when determining what reasonable alternatives should be considered." NEPA Handbook at 8-9; 40 C.F.R. § 1502.14(c). Such alternatives may include actions within the jurisdiction of agencies such as the State Water Board and the Regional Water Quality Control Boards, to address water quality habitat stressors created by the discharge of pollutants and contaminants. Alternatives may also include actions within the jurisdiction of the California Department of Fish and Game and the Fish and Game Commission, to address predator stressors created by implementation and enforcement of the bass fishing regulations.

As described in detail below, many other factors should also be considered in formulating alternative actions to be evaluated as part of the NEPA process. At a minimum, the following factors should be evaluated. These factors could potentially constitute elements of alternative actions themselves, or they could be evaluated as mitigation measures that apply no matter what alternative is ultimately selected.

1. Alternatives For The Protection Of All Listed Fish Species In The Delta

General measures should be included as alternatives to decrease the need to rely on curtailing exports by the projects. For example, Reclamation should consider methods for reducing the populations or impacts of alien species/predator species, such as striped bass. (PPIC 2011, *Managing California's Water: From Conflict to Reconciliation*, p. 212.) Alternatives that regulate smaller water diversions, especially unscreened diversions, should also be considered. It would also be appropriate to evaluate alternatives that require and implement an alternative conveyance, and/or reduce toxic chemicals. (PPIC 2011, pp. 222-224.) The 2012 Natural Research Council Report, *Sustainable Water and Environmental Management in the California Bay-Delta*, for example, described potential measures for managing risks to Bay-Delta ecosystems from selenium, methyl-mercury, pesticides/herbicides, emerging chemicals, metals, and legacy organic contaminants and PAHs. (NRC 2012, p. 75.)

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2. Alternatives That Address Specific Concerns Related To The Delta Smelt

a. X2 Location Management Should Not Be Considered Because It Is Not A "Reasonable Alternative"

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As a starting point for the alternatives analysis, the NOI implies that Reclamation will analyze flow management aspects of the 2008 FWS and 2009 NMFS BiOps and RPAs. FWS's effects analysis in the First Draft 2011 Formal ESA Consultation on the Proposed Coordinated Operations of the CVP and SWP, at pp. 285-290 (Dec. 2011), refers extensively to salinity and the low salinity zone ("LSZ") as a primary constituent element ("PCE") of delta smelt habitat.

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However, the best available science shows—and the district court found—that such an approach dramatically overemphasizes the influence of the fall location of X2 on delta smelt survival, reproduction and abundance. *Id.* at pp. 279-83. As Reclamation is well aware, FWS's 2008 BiOp contained a fall action that involved regulating the location of X2 for purported benefits to the delta smelt that was overturned by the Court based upon a lack of supporting evidence. Continued efforts to defend the imposition of Fall X2 in the face of substantial testimony—some of it from the FWS and Reclamation witnesses themselves—indicating that the location of Fall X2 bears little relationship to the abundance of Delta smelt ultimately caused the Court to characterize the FWS's witnesses as “zealots.”

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As further discussed in the document attached hereto as Exhibit C, the LSZ only weakly overlaps the delta smelt's habitat, which is comprised of a multitude of biotic and abiotic characteristics. In light of the analysis in Exhibit C as well as the thorough rejection of the Fall X2 Action by the Court, Reclamation should not commit to an inappropriate overemphasis of the LSZ's influence. Doing so would wrongly attribute impacts to the projects that only have a nominal effect on the species and lead to the selection of alternative measures for NEPA evaluation that waste water resources and have little or no benefit to the species. Moreover, as recognized by the court, the selection of measures that would impose substantial impacts on human health and the environment would be inconsistent with the water supply purpose of the projects.

b. Food Availability For Delta Smelt

Three recent life-cycle modeling studies (Maunder & Deriso 2011, MacNally et al. 2010, and Miller et al. 2012) found that food availability was a significant driver of delta smelt abundance. Consistent with these modeling efforts, the available scientific data from CDFG surveys show evidence that zooplankton food supplies for delta smelt are an important factor affecting the species' population dynamics. By contrast, these studies also show that the location of fall X2 and associated estimates of “abiotic habitat area” are not strong predictors of delta smelt population dynamics.

Food availability could be improved through alternatives that require: wetlands restoration, particularly salt marsh work, controlling ammonia discharges (Dugdale et al 2007) and nutrient inputs (i.e., total N inputs related to ammonium loading) rather than using flows to dilute the pollution; controlling the *Corbula amurensis* clam (NRC 2012, p. 70); controlling aquatic macrophytes; and/or controlling blooms of toxic cyanobacterium *Microcystis aeruginosa* (NRC 2012, p. 67.)

With respect to the *Corbula* clam, the infiltration of the clam into the Suisun Bay region since 1987 has caused major changes in the availability and composition of food sources in the LSZ. It has made Suisun Bay habitat less desirable, while the Cache Slough region—approximately 40 km away to the north and far removed from the LSZ's influence—has maintained important characteristics, such as higher turbidity and food availability, that facilitate spawning and rearing of delta smelt. Recent survey efforts have shown substantial year-round populations of delta smelt in the north Delta.

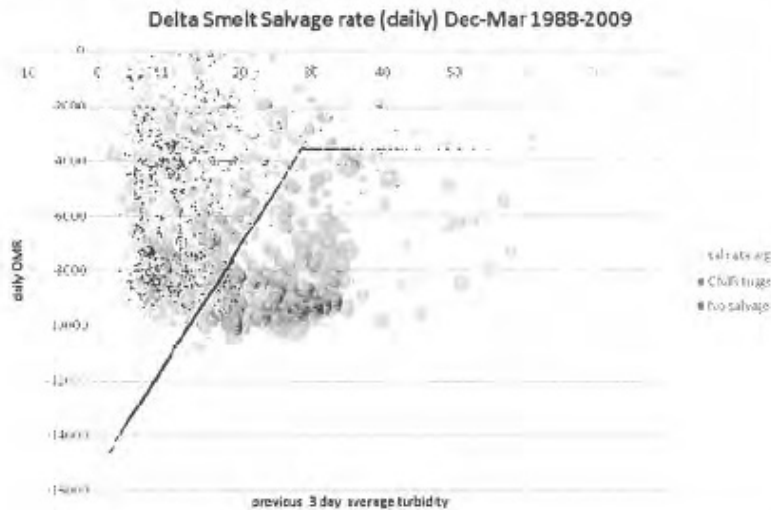
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c. A Combination Of Turbidity Conditions And Spring Flow Should Be Evaluated, Rather Than Just Focusing On OMR Flow Alone

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The best available scientific data also confirm that imposing OMR flow control alone, without simultaneous consideration of other factors affecting species geographic location and abundance, is insufficient. For the protection of delta smelt, in particular, the correlation of normalized salvage as a function of both turbidity and OMR flow shows that during conditions of low turbidity (i.e., clear water), salvage rates are low even when OMR is highly negative. This may occur because delta smelt avoid open waters and mid-channel areas where they are subject to higher predation and other stressors.

Figure 1, below, shows a bubble plot of normalized salvage as a function of both turbidity and OMR flow performed by Dr. Rick Deriso (2012), where the size of the bubbles is proportional to the amount of observed daily normalized salvage—the bigger the bubble, the larger the percentage of the population salvaged. As seen in the figure, most of the larger normalized salvage events (i.e., larger bubbles) lie in the region that the data suggests would be avoided by using less restrictive OMR limits than are in the remanded delta smelt biological opinion (i.e., the events in the region below and to the right of the OMR trigger would be avoided). Periods when no salvage occurred (i.e., the red dots) generally tend to occur in much greater frequency above and to the left of the trigger line. Thus, the bubble plot shows that salvage is generally more rare above the trigger line, but occurs more frequently and with generally larger salvage events below the trigger line.



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Figure 1. OMR trigger (Y axis) as a function of prior three-day average turbidity (X-axis), along with observed daily normalized salvage (bubble size). Data is shown only if there are three previous days with turbidity estimates and it is restricted to days with negative daily OMR flow (for a total of 1889 days).

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Importantly, OMR flow controls imposed in a vacuum do not provide any particular benefit to the species. The best available scientific data show that OMR flows have application in reducing entrainment, when used in combination with turbidity triggers and normalized salvage. Based upon this information, consideration should be given in the NEPA process to evaluating the environmental effects of an alternative action to protect delta smelt based upon coupling normalized salvage, turbidity and flow regimes. Using this information, alternatives can be developed to provide for the lowest salvage at the lowest possible water cost. Another important question is whether entrainment has population level effects, and if so under what circumstances. Any restrictions on OMR to limit entrainment should be limited to circumstances where doing so is necessary to avoid meaningful population level effects.

3. Alternatives That Address Specific Concerns Related To Salmonids

a. Temperature Control

Adequate temperatures need to be maintained for successful spawning, egg incubation, and fry development (between 42.5 and 57.5°F). (Salmonid MSJ Decision p.7, Doc. 633 (Sept. 20, 2011) (*Consol. Salmonid Cases*, 791 F. Supp. 2d 802 (E.D. Cal. 2011)); Salmonid BiOp p. 90, 93.) Temperature is one of the dominant factors affecting Salmonid populations. (Salmonid MSJ Decision p.58., Doc. 633 (2010).)

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b. Recreational And Commercial Fishing

The potential effects on listed species of recreational and commercial fishing should also be very carefully evaluated. Ocean harvest is one of the dominant factors affecting Salmonid populations. (Salmonid MSJ Decision p.58, Doc. 633 (2010).) As noted by Judge Wanger, "It is inexplicable that these species are being managed in a piecemeal fashion, without considering all aspects of their life cycle in the same analysis, which would facilitate description of the true effect Project operations have on the species in light of other conditions. What population is available to be affected by Project operations is entirely relevant, as all Defendants have sought to attribute the species' decline to Project operations." (Salmonid MSJ Decision p.86, Doc. 633 (2010).)

c. Ocean Conditions

Ocean conditions directly tie into ocean survival of salmonids. The NRC has explained that "patterns in atmospheric temperature, wind, and precipitation drive ocean temperatures, mixing and currents, which in turn control growth and advection of plankton that provide food for salmon." (NRC 2012, p. 95 (citing Batchelder and Kashiwai, 2007).) Thus, an alternative that increases the diversity of wild and hatchery salmon ocean entrance timing would help ameliorate unfavorable ocean conditions. (NRC 2012, p. 107.)

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d. Competition From And Control Of Hatchery Fish

Additionally, an alternative should be included that addresses competition from and control of hatchery fish, because NMFS itself identifies hatchery effects as a major stressor contributing to the decline of Central Valley steelhead. (NRC 2012, p. 92; *see also* NRC 2012, p. 95; PHC 2011, p. 221.)

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4. Green Sturgeon

Reclamation should also consider alternatives that address the green sturgeon population. Due to known temporal and spatial differences with salmonids, green sturgeon should be evaluated separately. To better understand these differences, more studies may be needed.

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Based on these factors, the Public Water Agencies suggest that Reclamation explore a broad suite of alternatives actions that will satisfy the agency's ESA obligations while also avoiding unnecessary limitations on the essential water supply operations of the SWP and CVP.

F. Mitigation Measures

In addition to analyzing the impacts of all potential, feasible alternatives, the EIS must include a discussion of the "means to mitigate adverse environmental impacts." 40 C.F.R. § 1502.16(h). Accordingly, the EIS must identify all relevant, reasonable mitigation measures that could alleviate a project's environmental effects, even if they entail actions that are outside the lead or cooperating agencies' jurisdiction. *See* "Forty Most Asked Questions Concerning CEQ's NEPA Regulations," No. 19b. Such measures must entail feasible, specific actions that could avoid impacts by eliminating certain actions; minimizing impacts by limiting their degree; rectifying impacts by repairing, rehabilitating or restoring the affected environment; reducing impacts through preservation or maintenance; and/or compensating for a project's impacts by replacing or providing substitute resources. 40 C.F.R. § 1508.20. Any environmental effects that may occur as a result of implementation of these mitigation measures must also be disclosed and analyzed.

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As with the identification and analysis of alternatives and project components, the development of mitigation measures has the potential to greatly reduce environmental impacts, including those to the listed species and other biota, which could result from some component of the various alternatives. Determining the precise impacts that project operations and the projects' components currently have on the listed species is vitally important; otherwise, mitigation measures (or alternative actions) may be imposed that will have additional environmental impacts but will not actually avoid, minimize, rectify, reduce, or compensate for the project's impacts. In addition, the effectiveness of any mitigation measures in reducing such impacts must be determined, as well as how much those impacts will be reduced by any particular mitigation measure. *See South Fork Band Council of Western Shoshone of Nevada v. U.S. Dept. of Interior*, 588 F.3d 718, 727 (9th Cir. 2009). Some of the actions discussed above in the section on alternatives could potentially also function as mitigation measures. Other types of mitigation measures, including restoration of habitat, could also be explored.

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V. EVALUATION OF POTENTIAL ENVIRONMENTAL IMPACTS OF ALTERNATIVES

As discussed above, the potential environmental impacts associated with implementing each alternative must be evaluated in the EIS. Impacts occurring not only in the Delta and surrounding areas, but also in the service areas of water agencies that deliver Delta water to tens of millions of Californians and hundreds of thousands of acres of farmland must also be analyzed. As cooperating agencies representing member agencies that have first-hand knowledge of the impacts of reduced Delta water deliveries, the Public Water Agencies can provide some of the specific information that will be needed for this analysis. We include the following information as an overview of the types of impacts to be evaluated, and other critical considerations and information that must be included. Additional, more detailed descriptions of specific environmental impacts that should be evaluated, as well as supporting references, are provided in Exhibit D.

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A. Impacts To Specific Resource Categories

1. Water Resources, Including Groundwater

Given the value of and constraints on reliable water supplies in California, virtually any reduced deliveries of Delta water supplies to SWC and SLDMWA member agency service areas will have demonstrable, dramatic, and undeniable environmental impacts. Lower export water deliveries translate directly into water losses for urban and agricultural users. Such reduced deliveries compel greater reliance by retail agencies and their customers on groundwater to meet demand not only in dry years, but in other year types when greater exported water deliveries are currently anticipated. In turn, reduced exports and deliveries during more year types and in greater quantities diminish the ability of water managers to replenish and store groundwater when water is available to do so.

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These circumstances can, and likely will, lead to additional groundwater overdraft (pumping beyond an aquifer's safe yield) throughout the Public Water Agencies' service areas, particularly in agricultural areas. Reduced groundwater levels can also lead to land subsidence that can additionally damage water conveyance facilities and other infrastructure, as has been documented throughout the state. For example, at the recent May 22, 2012 Scoping Meeting held in Los Banos, a speaker from the Central California Irrigation District stated that the District has spent \$4.5 million to rehabilitate its conveyance facility, due to land subsidence resulting from groundwater overdraft and is involved in another \$2.5 million program with Fresno County to study and replace a bridge damaged by land subsidence.

Reduced ability to replenish ground and surface water reserves also adversely impacts the ability of water purveyors to store water for dry years and emergencies. As just one example, reduced water storage can be expected to render southern and central California increasingly vulnerable to having insufficient supplies to suppress wildfires or sufficient supplies to survive a severe earthquake affecting conveyance facilities or other catastrophic events. Reduced exports of Delta waters also results in increased reliance by retail water users and their customers on other limited and lower quality supplies, such as recycled water, that need to be blended with SWP water to make them available for beneficial use. Finally, any impacts to the ability of the

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CVP and SWP to facilitate water transfers, including transfers of non-project water, should be addressed. For example, Reclamation must evaluate and disclose whether an alternative imposes additional operational constraints that limit (from "no action" conditions) the time or frequency when such transfers could be accomplished. These are just a few of the dozens of potential impacts to water resources that will result from reduced export and delivery of Delta water supplies to the SWP and CVP service areas.

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2. Land Use, Including Agriculture

Reduced SWP and CVP deliveries will result in significant changes in land use, particularly in agricultural landscapes. As dramatically shown during the 2007-2010 period, reduced export water deliveries can and will increase fallowing of land across the Central Valley and elsewhere. Reduced water supplies can also cause shifts toward planting permanent crops that have diminished ongoing water requirements, but which also require watering year-in and year-out, thus diminishing future flexibility in water budgeting by precluding management options such as annual crop-shifting or fallowing. Reduced supplies and lower quality water can also impact the production of certain crops, as well as the yield of crops that are grown. The unavailability of project water also increases the costs to obtain supplemental water. Lost exports also negatively impact water management plans that are produced by water agencies as source documents for evaluating land use projects. As imported water supplies become less reliable, establishing firm water supplies sufficient to meet land use planning requirements becomes more difficult.

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3. Socioeconomics

Reduced Delta water supplies also cause socioeconomic impacts. In response to reduced water supplies, farmers fallow fields and this reduced agricultural productivity results in layoffs, reduced hours for agricultural employees, and increased unemployment in agricultural communities. Reduced agricultural productivity also has socioeconomic impacts for agriculture-dependent businesses and industries. In addition, unavailability of stable and sufficient water supplies reduces farmers' ability to obtain financing, which results in employment losses, due to the reduced acreage of crops that can be planted and the corresponding reduction in the amount of farm labor needed for that reduced acreage. Reduced water supplies and the resulting employment losses also cause cascading socioeconomic impacts in affected communities, including increased poverty, hunger, and crime, along with dislocation of families and reduced revenues for local governments and schools. In the urban sector, reduced supplies or increased supply uncertainty can cause water rates to increase as agencies seek to remedy supply shortfalls by implementing measures to reduce demand or augment supplies. Connection fees and other one-time costs for new developments may also increase and further retard economic development.

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Some of personal and regional socioeconomic impacts of reduced water supplies, particularly to agriculture-dependent communities located on the westside of the San Joaquin Valley, were described by speakers at the May 22, 2012 Scoping Meeting held in Los Banos. At that meeting Congressman Costa described some of the socioeconomic impacts of the reduced water supplies resulting from the BiOps, stating:

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the low average rainfall and court ordered restrictions and, in my opinion, severely misguided regulations that we saw formed in 2008 and 2009, created some of the most severe water shortages in farming communities in my district and throughout the valley in the last 3 years. Starting with a zero water allocation, zero percent in 2009, some of the hardest working people you'll ever meet, many of you in this room, stood in food lines, unable to have work because there was no water and it should have never happened. Thousands of jobs were lost and unemployment reached in communities like Mendota and Firebaugh, over 40%.

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Another speaker at the meeting, Fresno County Board of Supervisor Judy Case, described the socioeconomic impacts of the reduced water supplies, stating:

We're here to talk about what happens when there's no water on the west side. Workers lost their jobs. They not only lost their jobs, they lost jobs that had become permanent with benefits so they had healthcare for their families. Unemployment in Fresno County was higher than the entire United States. We kept unemployment up at 43 percent. And people who have worked really hard to purchase their first home they lost it in foreclosure and they were put in food lines in which food was provided.

As a County, we provide safety nets to help people in a position who can't help themselves and our request for services soared. Some families were forced to leave the area to look for jobs and for work and they left with their children which affected the local schools which lost students and the revenue that came to support those students. For families to survive, they left the house they had just bought and been so hopeful for and they moved in with relatives with two and three and four families living in the same house or apartment.

The statements made by one farmer at the scoping meeting exemplify the real-world impact of reducing water supply deliveries:

2009 is a year that is engraved in my mind and it is there because it should never happen again. The impacts were severe on our farm. On my farm alone, I have over 900 acres of land. On those 900 acres were losses that were huge. In farmgate prices, in millions of dollars of losses, in wages, in hundreds of thousands of dollars of food for millions of people around the country. The effects were terrible on our farm, but the effects were more terrible on our farm workers. We saw people without jobs. We saw people who were working then they were unemployed. People that instead of working 60 hours per week were working 40 and 45 hours per

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week. We tried not to lay people off so we just reduced their hours because our farm was cut down from 2,200 to approximately 1,300 acres.

There were other impacts in my area. We saw many people who lost jobs move away. These are people that are skilled at what they do. Driving tractors, irrigating and harvesting. Many of these people didn't come back. We saw in my area the little brown school out in the country that I went to since I was in first grade closed down for lack of enrollment. So, it hurts us a lot to think about that and we should never forget that.

These statements reflect some of the significant socioeconomic impacts of reducing water supplies to the farms, families and businesses that depend of CVP and SWP water. These impacts are very real and must be honestly explored and evaluated in the NEPA process for any alternatives that would reduce CVP and SWP water supply deliveries.

4. Environmental Justice

Although the impacts from reduced water supplies will have significant impacts on people and farmland throughout the state, the hardest hit areas will be in predominantly poor and minority communities—especially in the Central Valley where employment losses and environmental effects will be the most prevalent. As a result, water export losses have the potential to disproportionately impact disadvantaged communities and persons.

5. Biological Resources, Including Fish, Wildlife, And Plant Species

Perhaps more than any other resource category, the evaluation of impacts to biological resources will entail a multi-fold analysis. On one hand, reduced Delta exports will impact biological resources dependent upon imported water from the CVP or SWP for their sustenance. Indeed, wetland and riparian areas across the state, including some national and local wildlife refuges, are maintained, in part, by imported water supplies from the CVP and SWP. The fallowing of fields in response to the reduced availability of CVP and SWP water supplies also increases the proliferation of weeds and other invasive species. Invasive species can harbor disease, choke out native species, adversely affect transportation corridors, and clog irrigation canals.

On the other hand, the EIS will also have to assess the impacts or biological benefits, if any, to the listed species and other biota from the various alternatives evaluated. The Public Water Agencies believe that this portion of the NEPA analyses will provide vital information for the public and decision makers. A major value of NEPA comes in the comparison that may then be made between the effects on the listed species of the no action alternative compared to the other alternatives. Alternatives can also be compared among themselves. In evaluating and comparing these action alternatives, NEPA requires that Reclamation discuss the level of uncertainty and conflicting information in the data used to develop the impacts analyses. Making this information available to the public and decision-makers will allow a fully informed

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decision to be made and provide clear explanation and accountability for that discretionary choice.

6. Water Quality

Reduced water supplies impact water quality by reducing water agencies' ability to blend lower quality water (e.g., from local groundwater or recycled water) with the higher quality Delta water, which is frequently needed to make the latter water sources beneficially usable. Increased pumping of local groundwater to offset export losses can adversely affect water quality by drawing poor quality or brackish water into higher quality groundwater basins. Increased reliance on groundwater for irrigation can also negatively impact the water quality of surface water streams due to the leachates present in the groundwater that becomes stream runoff.

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7. Air Quality

Reduced Delta water supply deliveries can adversely impact air quality because land fallowing generally results in increased dust and particulate emissions. Additionally, increased air emissions will occur because of the greater amount of energy that is needed for groundwater well pumps to lift water from a lower depth due to the greater reliance on and depletion of groundwater reserves associated with reduced availability of export water supplies.

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8. Soils, Geology, And Mineral Resources

Reduced Delta water supplies impact soils, geology, and mineral resources because increased groundwater use results in soil subsidence due to reduced groundwater replenishment. In turn, greater deposits of salts that negatively affect soil quality occur as a result of relying more heavily upon lower quality groundwater sources. In addition, reduced agricultural planting and increased fallowing leads to greater topsoil lost to erosion.

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9. Visual, Scenic, Or Aesthetic Resources

Aesthetics are impacted by reduced water supplies because resulting socioeconomic impacts from lost agricultural employment will affect urban decay in regions affected by resulting employment losses. Lower reservoirs and water levels in the upper watersheds from restrictions that require reservoir releases, and barren and decaying farmland where planting and maintenance is infeasible due to the unavailability of delta water supplies, will have negative aesthetic impacts. Increased reliance on groundwater can also negatively impact aesthetic resources by causing damage to infrastructure from land subsidence.

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10. Global Climate Change, Transportation, And Recreation

Reduced water supplies from the Delta and increased reservoir releases to meet RPA requirements can also impact climate change due to the greater amount of energy and resulting emissions needed for pumping groundwater from greater depths, reductions in carbon uptake by plants, and changes in the timing and magnitude of project hydropower generation. Transportation can be impacted by greater impediments from blowing dust on fallowed lands,

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tumbleweeds, and bird-on-aircraft strikes. Recreation impacts are also likely to occur due to impacts on reservoir levels and upper watershed flows.

B. Comparison Among Alternatives

One of the key values of an EIS is its ability to inform the public and decision-makers of the relative environmental and socioeconomic costs and benefits of each alternative, including the no action alternative. An EIS does so by including information and analyses that allow and provide a comparative assessment of the environmental impacts or benefits among these alternatives. Accordingly, in the forthcoming EIS Reclamation must provide a comparison of the benefits and/or impacts of each alternative on all the various resource categories. Because part of the purpose and need entails ESA compliance by operating the projects to avoid jeopardizing the species or adversely modifying their critical habitats, it is critical that the EIS at a minimum provide analyses and descriptions for the no action alternative and the various other alternatives of the estimated increase or decrease in: (1) the numbers of individuals of each species, (2) the estimated population viability of the listed species, and (3) the amount or quality of their critical habitats. This is not an exhaustive list, and Reclamation should determine if other biological metrics would also be useful and appropriate. Because maintaining the projects' water supply reliability is a key aspect of the purpose and need, Reclamation should provide a commensurate level of analysis and detail regarding the degree to which each alternative would impair the ability of the CVP and SWP to serve their water supply functions.

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In addition to including extensive analyses and discussion, the Public Water Agencies agree with Reclamation's recently released NEPA Handbook, which states:

A summary table comparing the impacts of all alternatives (including no action) should be attached to the end of the alternatives chapter. Whenever possible, numerical comparisons should be used. Brief narrative comparisons are permissible if numerical comparisons cannot be made. ... The graphic display should provide a comparison of the tradeoffs between alternatives and a listing of proportionate effects and merits of each alternative.

NEPA Handbook at 8-13. Dually providing analytic information in both text and tabular or other graphic formats will best provide full and understandable disclosure to the public and decision-makers of the relative merits of each action alternative and the no action alternative, and better inform and support any policy decisions Reclamation makes at the end of the NEPA and ESA consultation processes.

C. Cumulative Impacts

NEPA requires that an EIS also include an analysis and discussion of cumulative environmental impacts, which must discuss the likely long-term impacts from each alternative in conjunction with other reasonably foreseeable actions and future events. As discussed elsewhere in this letter, there are numerous other stressors currently affecting the listed species that are or may be having a cumulative effect on the species. We earlier suggested developing alternatives

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to address these impacts. The Public Water Agencies also encourage Reclamation to explore in the EIS whether any mitigation would address these other causes of cumulative effects, which could maintain or improve the conditions of any of the listed species so as to allow sustained and improved project operations for water supply reliability.

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Additionally, there are numerous actions that have recently been completed or are currently being implemented by private, local, state, and federal actors throughout the project area to improve the habitat and status of the listed species whose benefits to the species must be taken into account in all the alternatives. These actions include gravel augmentation to improve salmon spawning conditions, changes in the operations or physical character of diversions (better screens or ladders), and modifications to other structures to improve passage for salmonids and green sturgeon. For example, a new biological opinion on the Yuba River requires the Army Corps of Engineers to implement extensive gravel augmentation and improvements to fish ladders on that tributary for the benefit of salmonids. Similarly, the operations of the Red Bluff Diversion Dam on the Sacramento River have been and will be modified in the future in a manner that will benefit survival, spawning, and passage of salmonids and the green sturgeon as a result of construction of new alternate diversion structures to serve the Tehama-Colusa Canal Authority. There are also other extensive habitat restoration plans ongoing in the Delta and on the San Joaquin River, as well as other Delta tributaries. While a comprehensive listing is not possible here, Reclamation must identify and discuss these ongoing and planned projects and programs and include the estimated improvements to the status of the listed species and their habitats in their evaluation of the impacts of the alternatives, including the no action alternative. At a minimum, the expected beneficial impacts of requirements in other biological opinions issued by FWS and NMFS that address the listed species at issue here must be identified and included in the analysis.

D. Disclosure And Discussion Of Scientific Uncertainty And Data Gaps

Part of the value of the NEPA process is its requirement to disclose and discuss the relevance of conflicting, inconsistent data and unavailable or incomplete data. Past regulatory decisions taken without the guiding light of NEPA have been made with an unjustified claim of certainty or necessity without acknowledgment of the significant uncertainty or imprecision that accompanied such actions. This obscures the true weight of the policy decisions set before the agency, and discourages honest and critical evaluation of policy options. Accordingly, when Reclamation is "evaluating the reasonably foreseeable significant adverse effects on the human environment in [the EIS] and there is incomplete or unavailable information," it is required to "always make clear that such information is lacking." 40 C.F.R. § 1502.22. If, for example, there is incomplete or unavailable information regarding the effects of the proposed action and the alternatives on salmonids and/or Delta smelt, Reclamation must disclose and discuss this issue. However, "[e]very effort should be made to collect all information essential to a reasoned choice between alternatives." NEPA Handbook at 8-16. At a bare minimum, if the relevant incomplete information "cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known," Reclamation must include a statement in the EIS explaining the nature of such information, its relevance, a summary of existing credible scientific evidence, and Reclamation's evaluation of potential impacts based on approaches or methods generally accepted in the scientific community. 40 C.F.R. § 1502.22(b).

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In 2004, the National Research Council issued a report addressing the degree of scientific certainty, or lack thereof, regarding measures imposed under the ESA for the protection of listed fishes in the Klamath River basin. National Research Council, *Endangered and Threatened Fishes in the Klamath River Basin: Causes of Decline and Strategies for Recovery*. Washington, DC: The National Academies Press, 2004. To accomplish their charge, the committee developed “specific conventions for judging the degree of scientific support for a proposal or hypothesis” in the Klamath biological opinions. *Id.* at p. 35. The committee summarized these conventions in the following table:

TABLE 1-2 Categories Used by the Committee for Judging the Degree of Scientific Support for Proposed Actions Pursuant to the Goals of the ESA

Basis of Proposed Action	Scientific Support	Possibly Correct?	Potential to be Incorrect
Insatiation, unsupported assertion	None	Yes	High
Professional judgment inconsistent with evidence	None	Unlikely	High
Professional judgment with evidence absent	Weak	Yes	Moderately high
Professional judgment with some supporting evidence	Moderate	Yes	Moderate
Hypothesis tested by one line of evidence	Moderately strong	Yes	Moderately low
Hypothesis tested by more than one line of evidence	Strong	Yes	Low

These or similar criteria should be explicitly applied in the NEPA process here to assess the strength of any scientific justification for proposals to restrict project operations and intended to benefit listed species. Doing so will assist policymakers and the public in better understanding the choices to be made among alternatives.

Some have sought to justify restrictions on CVP and SWP operations even in the absence of substantial scientific support based on the “precautionary principle.” As the Klamath report observed, however, “even when a policy decision is made to apply the precautionary principle, the question of whether the decision is consistent with the available scientific information is important. . . . At some point [] erring on the side of protection in decision-making ceases to be precautionary and becomes arbitrary. One indication that policy-based precaution has given way to bias or political forces is a major inconsistency of a presumed precautionary action with the available scientific information.” *Id.* at 315. If the federal agencies make a policy decision to apply the precautionary principle here, that choice should be explicit, so that the choice and the tradeoffs involved are made clear to the public and any reviewing courts. That policy choice has not been made explicit in past decisions. In the litigation regarding the 2009 Salmonid BiOp, for example, NMFS sought to justify a restriction on OMR flows based on precaution, but as the

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district court found “nowhere in the BiOp (or any other document in the administrative record cited by the parties) [did] NMFS disclose its intent to use a ‘precautionary principle’ to design the RPA Actions.” *Consolidated Salmonid Cases*, 713 F. Supp. 2d 1116, 1145 (E.D. Cal. 2010).

In sum, Reclamation should be explicit in identifying the scientific uncertainty associated with any restrictions on project operations that are proposed as necessary to comply with the ESA.

E. Information Quality Act

The Information Quality Act (Public Law 106-554) and orders, regulations, and guidelines issued thereunder impose additional requirements on Reclamation that must be applied to this NEPA process. Reclamation recently issued its peer review policy to implement the mandate in the Office of Management and Budget’s Bulletin and Guidelines that important scientific information “shall” be peer reviewed by qualified specialists before being used to inform a government decision (“IQA Policy”). Reclamation’s IQA Policy requires peer reviews of all scientific information that is determined to be “influential scientific information” or “highly influential scientific assessments.” The IQA Policy applies to NEPA documents:

This policy applies to all scientific information produced, used, or disseminated by Reclamation. This includes scientific information that, along with other factors, informs a policy or management decision. For example, this Policy applies to scientific components of an environmental document prepared pursuant to the National Environmental Policy Act that present a scientific evaluation or are otherwise based upon scientific information.

(Reclamation IQA Policy section 5(B)) The forthcoming EIS will likely qualify for peer review under Reclamation’s policy either as a “highly influential scientific assessment” or an “influential scientific assessment” based on the level of controversy, potential for societal and resource impacts or implications, the degree to which the scientific information may be novel or precedent setting, and the clear and substantial impact on important public policies and private sector decisions that may be implicated. Accordingly, the Public Water Agencies urge Reclamation to be prepared to implement the IQA peer review policy.

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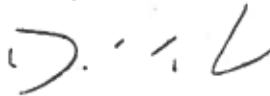
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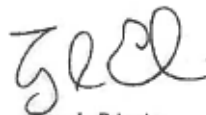
VI. CONCLUSION

The Public Water Agencies thank Reclamation for providing the opportunity to submit comments for consideration in the scoping process. These comments are intended to provide Reclamation with a clear understanding of a few of the primary concerns of the Public Water Agencies and their member agencies as they continue the important work of providing safe, sufficient water to millions of Californians and hundreds of thousands of acres of highly productive farmland. The Public Water Agencies reserve the right to submit additional comments as the NEPA process proceeds. The Public Water Agencies, including individual SWC member agencies, as appropriate, look forward to participating as cooperating agencies, to hearing from you regarding a meeting to develop an MOU, and to working with Reclamation in a cooperative manner in developing the environmental review for the OCAP.

Sincerely,



Daniel G. Nelson
Executive Director
San Luis & Delta-Mendota Water Authority



Terry L. Erlewine
General Manager
State Water Contractors, Inc.



Thomas Birmingham
General Manager
Westlands Water District

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EXHIBIT A

State Water Contractor Member Agencies

The State Water Contractors' members are: Alameda County Flood Control and Water Conservation District Zone 7; Alameda County Water District; Antelope Valley-East Kern Water Agency; Casitas Municipal Water District; Castaic Lake Water Agency; Central Coastal Water Authority; City of Yuba City; Coachella Valley Water District; County of Kings; Crestline-Lake Arrowhead Water Agency; Desert Water Agency; Dudley Ridge Water District; Empire-West Side Irrigation District; Kern County Water Agency; Littlerock Creek Irrigation District; Metropolitan Water District of Southern California; Mojave Water Agency; Napa County Flood Control and Water Conservation District; Oak Flat Water District; Palmdale Water District; San Bernardino Valley Municipal Water District; San Gabriel Valley Municipal Water District; San Geronimo Pass Water Agency; San Luis Obispo County Flood Control & Water Conservation District; Santa Clara Valley Water District; Solano County Water Agency; and Tulare Lake Basin Water Storage District.

San Luis & Delta-Mendota Water Authority Member Agencies

The Authority's members are: Banta-Carbona Irrigation District; Broadview Water District; Byron Bethany Irrigation District (CVPSA); Central California Irrigation District; City of Tracy; Columbia Canal Company (a Friend); Del Puerto Water District; Eagle Field Water District; Firebaugh Canal Water District; Fresno Slough Water District; Grassland Water District; Henry Miller Reclamation District #2131; James Irrigation District; Laguna Water District; Mercy Springs Water District; Oro Loma Water District; Pacheco Water District; Pajaro Valley Water Management Agency; Panoche Water District; Patterson Irrigation District; Pleasant Valley Water District; Reclamation District 1606; San Benito County Water District; San Luis Water District; Santa Clara Valley Water District; Tranquillity Irrigation District; Turner Island Water District; West Side Irrigation District; West Stanislaus Irrigation District; Westlands Water District.

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**EXHIBIT B
SCIENTIFIC DEVELOPMENTS
2009-CURRENT**

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Appendix 1C: Comments from Regional and Local Agencies and Responses

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Appendix 1C: Comments from Regional and Local Agencies and Responses

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EXHIBIT C

**RATIONALE FOR EXCLUDING ALTERNATIVES FROM THE EIS THAT IMPOSE
PROJECT OPERATIONAL RESTRICTIONS FOR MANAGING THE LOCATION OF
X2 IN THE FALL**

**a. Recent Life-Cycle Models Uniformly Conclude That X2 Location Is
Not A Significant Factor Affecting Subsequent Delta Smelt
Abundance**

In the last three years, peer-reviewed delta smelt life-cycle modeling studies have been undertaken by Maunder & Deriso (2011), MacNally et al. (2010), Thomson et al. (2010), and Miller et al. (2012). These published works have assessed the importance of a suite of factors on Delta fish species, with particular focus on delta smelt. None of the studies found evidence of a relationship between the location of X2 and subsequent delta smelt abundance. FWS, First Draft 2011 Formal ESA Consultation on Proposed Coordination of CVP and SWP p. 268 (Dec. 2011).

In addition, the National Research Council reviewed the studies the 2008 Delta Smelt OCAP biological opinion relied upon as support for regulating the position of fall X2 and concluded that the BiOp's reliance on Feyrer et al. (2007) was improper, due to the study's unacknowledged uncertainty arising from improperly linking several statistical models as well as the lack of rigor in the analysis (National Research Council 2010). A federal district court also examined several of the studies relied upon in the BiOp, including Feyrer et al. (2007, 2011), and reached the conclusion that the best available science did not demonstrate a relationship between fall X2 location and subsequent delta smelt abundance (X2 Decision 2011). The court also noted that the Feyrer analyses were limited to an examination of abiotic habitat factors which ignored species' food supplies and other biotic factors. X2 Decision at 34-36, 132 (2011) (*In re Consol. Delta Smelt Cases*, 812 F. Supp. 2d 1113 (Aug. 31, 2011)). Moreover, the Feyrer studies themselves acknowledged that their analysis was limited and not appropriate for use as a regulatory mechanism (Feyrer et al. 2007).

**b. Historical Survey Data Show That Delta Smelt Distribution Only
Weakly Overlaps The LSZ, And Thus the LSZ Should Not Be Used
As A Habitat Surrogate**

Historic survey data show that regulating SWP and CVP operations to manage the location of fall X2 is unnecessary to expand the geographic area utilized by pelagic fish species, such as delta smelt. Contrary to assumptions relied upon, for example, in the 2008 Delta Smelt OCAP biological opinion, applicable survey and other data show that the distribution of delta smelt in the fall occurs over a wide range of environmental and salinity conditions ranging approximately 40 km from Suisun Bay to the Cache Slough region in nearly all years. The LSZ is often referred to as stretching from 0.5 to 6 psu; however, survey data show that delta smelt can be found at salinities substantially greater than 10 psu downstream from the LSZ, and are frequently found in substantial numbers in freshwater portions of the Delta upstream from the LSZ such as the Cache Slough Complex.

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Thorough analysis of data collected in California Department of Fish and Game ("CDFG") Fall Midwater Trawl ("FMWT"), 20 mm, and Summer Trawl ("STN") surveys has failed to identify *any* correlation between the location of X2 in the fall and delta smelt distribution, reproduction, or food availability (Hanson 2011). Reclamation's own biologist, Matt Nofriga, testified during a hearing before the federal district court that: "I think that in terms of the historical data, that the three models probably indicate there's – that you're not going to find a correlation out of the historical data." *Consolidated Delta Smelt Cases*, 812 F. Supp. 2d 1133, 1160 (E.D. Cal. 2011). Thus, the analysis of survey data is consistent with the conclusions reached in the delta smelt life-cycle modeling efforts: there is no relationship between fall X2 location and delta smelt abundance.

More recent analyses of the historical survey data also show that the geographic distribution of delta smelt is much broader than previously acknowledged—covering more than 51,800 hectares and areas beyond the LSZ. Merz et al. (2011) extensively reviewed the relevant survey data and concluded that year-round populations of delta smelt are likely present in the lower Sacramento River to Suisun Marsh region, as well as in the Cache Slough, and Sacramento Deepwater Ship Channel region of the northern Delta. Merz et al. (2011) also noted observations of delta smelt at the most upstream sampling station locations, thus indicating that the current surveys may not capture the full extent of smelt distribution upstream of the LSZ. In terms of highest delta smelt densities, the study found that spawning seems to occur in vast regions of the Delta (i.e., Suisun Marsh, Cache Slough, the lower Sacramento River, and Napa River); rearing occurs mainly in Grizzly Bay and the lower Sacramento River; and adults (i.e., the migration phase) tend to occur further east, near the confluence of the Sacramento and San Joaquin Rivers and into the lower Sacramento River region. The existence of a year-round demographic unit of delta smelt in the Cache Slough region also demonstrates that it is likely not a semi-anadromous species as previously believed (Baxter et al. 2010).

The FMWT did not begin surveying in the Cache Slough and Sacramento River Deep Water Ship Channel region until 2009, and the STN survey was not expanded to these areas until 2011. Thus, previous studies ignored a substantial region occupied by the delta smelt population. Indeed, a federal district court, relying on admissions made by the primary author of the studies, found that Feyrer et al. (2007, 2011) studies did not consider the region of Cache Slough in their analyses. 812 F. Supp. 2d at 1155-56; 1201-1202. However, some of the highest densities of larva and juveniles have been sampled in this region in recent years, suggesting that the range of delta smelt spawning and rearing includes areas a significant distance from Suisun Bay. The current scientific consensus is that delta smelt are not restricted solely to the LSZ and that management efforts need to incorporate measures not singly focused on X2 location in the fall.

It is also beyond scientific dispute that habitat is a species-specific concept, and the habitat of a species includes the geographic areas it occupies, all the resources it uses, and the conditional states of those resources. X2 is a poor surrogate of habitat for delta smelt, not only because much of the population resides in areas outside the LSZ, but also because many parts of the LSZ have not been occupied by delta smelt during most of the past decade despite those areas' regularly having salinities within the LSZ range. Thus, it is apparent that delta smelt habitat is not defined by salinity because the LSZ in autumn only weakly overlaps the

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distribution of delta smelt. Because extensive areas of the LSZ do not support delta smelt, much of the LSZ should not be considered habitat for delta smelt.

In addition, the delta smelt located in the upstream, freshwater environment of Cache Slough—which in recent years have comprised as much as one-third of the total number of individuals observed in surveys—are largely unaffected by winter and spring objectives related to X2 and outflow. Rather than migrating upstream to spawn and downstream to rear, the delta smelt appear to simply spread out into available habitat.

c. Conclusion Re Fall X2

Productivity in the LSZ has been drastically limited by springtime suppression of phytoplankton blooms from ammonium loading and feeding by the *Corbula amurensis* clam, which has resulted in a reduced carrying capacity in the Suisun Bay region (Glibert 2010, Kimmerer 2009, Kimmerer 2006). However, the delta smelt occupies a much larger area than just the LSZ (Baxter et al. 2010, Hanson 2011). These and other factors show that regulatory efforts should be directed toward life-cycle modeling related to the relevant fish species to help better determine what factors (e.g., ammonium loading and food supply) are contributing to reductions in delta smelt abundance and how those factors can be addressed to improve the health and numbers of the species. Reclamation cannot promote an action based on a one-size-fits-all variable when there are many more complex interacting variables in the Delta ecosystem that must be addressed for the species' recovery.

The Public Water Agencies are legitimately concerned with FWS's and Reclamation's prior presumptions that the LSZ (and thus any impact from the SWP and CVP on the downstream extent of the LSZ) determines species abundance. Efforts to bolster this flawed hypothesis should be abandoned, the location of fall X2 should not be a primary focus of any regulatory regime, and efforts should rather focus on the proven drivers of species abundance that would improve habitat for delta fishes.

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EXHIBIT D

ENVIRONMENTAL IMPACTS

As explained above, the Public Water Agencies submit that a scientifically rigorous analysis of the effects of CVP and SWP operations in accordance with ESA section 7 will conclude that operations are not likely to jeopardize the listed species or adversely modify their critical habitat. Accordingly, no major changes to CVP and SWP operations should be required to comply with the ESA, and there should be no loss of water supplies and associated impacts. The proposed action should not include major changes to CVP and SWP operations. However, to the extent that Reclamation considers alternative actions involving changes to CVP and SWP operations, and those changes to operations would reduce water supplies, then Reclamation must analyze and disclose the associated impacts. The following discussion is intended to assist Reclamation in identifying potential impacts related to loss of CVP and SWP water supplies resulting from such alternatives.

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1. Water Resources, Including Groundwater

Reduced deliveries of Delta water supplies into the service areas of the Public Water Agencies member agencies have demonstrable, dramatic, and undeniable impacts on groundwater pumping, risk of groundwater overdraft, local surface water supplies, provision of emergency services, the ability to suppress wildfires, and a host of other impacts. Operational changes to the projects necessary to meet OMR and other flow requirements can lead to increased reservoir releases in the spring, decreased reservoir releases in the summer, decreased reservoir carryover storage, and decreased Delta export pumping.

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a. Loss Of Surface Water Supplies For End Users

By way of background, it is undeniable that reduced Delta exports result in reduced supplies in the SWP and CVP service areas. It was undisputed in the delta smelt and salmonid district court cases that "every acre-foot of pumping foregone during critical time periods is an acre-foot that does not reach the San Luis Reservoir where it can be stored for future delivery to users during times of peak demand in the water year."¹ It is also "beyond dispute" that water supply reductions from the BiOps have the potential to significantly affect the human environment.²

"The quantity of water lost through pumping reductions translates directly into water losses for urban and agricultural users."³ "In the SWP service area, one acre-foot of water serves about five to seven people for one year."⁴ "Water loss for agricultural users results in reduction

¹ *Consolidated Salmonid Cases*, 713 F. Supp. 2d 1116, 1148 (E.D. Cal. 2010).

² *Consolidated Salmonid Cases*, 688 F. Supp. 2d 1013, 1034 (E.D. Cal. 2010).

³ 713 F. Supp. 2d at 1151.

⁴ 713 F. Supp. 2d at 1151; PI Transcript 186:25-187:1-3 (April 6, 2010).

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in the number of acres that may be sustained with actual water supply.⁵ In the SWP service area, it takes approximately 3 acre-feet of water per acre to sustain a crop for a growing season.⁶

b. Operational Constraints, Non-Project Factors, And Water Demand May Exacerbate Water Supply Impacts From Pumping Restrictions

The level of San Joaquin River flow at Vernalis affects OMR flows, which in turn affects the magnitude of the impact of the OMR flow restrictions.⁷ Export facility capacities (either their physical capacity or their operational capacity) can restrict exports under wetter conditions, as occurred in the case of the SWP's pumping facilities on several occasions in January of 2011 due to equipment availability and personnel issues. Project demands can affect the level of exports. Irrigation demands, in particular, are low during the months of December through February, and begin to increase in March and during the later spring months. Storage capacity can restrict or expand exports, particularly during the winter months when demands for direct delivery of project water are lower. Exports at the SWP's Banks Pumping Plant can also be increased when the federal share of San Luis Reservoir fills and pumping capacity at the CVP's Tracy Pumping Plant is available to be used to enhance the pumping capacity otherwise available at the Banks Plant alone. Practical operational considerations can also restrict exports because the project operators will generally operate to meet a lower spring OMR flow level than that specified in the RPAs in order to ensure that they do not exceed the specified level. State Water Resources Control Board Water Right Decision 1641 also restricts exports based on several parameters including the export-to-total Delta inflow ratio, thus providing protections to listed species and their habitats.

c. Groundwater Overdraft, Subsidence, Resulting Dangers

Reductions in Delta exports have a direct impact on groundwater levels across the Public Water Agencies' service areas, particularly in agricultural regions.⁸ Reduced Delta water means that Public Water Agencies will not be able to replenish and store groundwater, or will be able to do so at a reduced rate, and will also need to rely more heavily upon groundwater reserves to meet demand.⁹

Shortage of surface water supplies, and the corresponding reliance on groundwater supplies, also leads to groundwater overdraft, which occurs when pumping exceeds the safe yield of an aquifer.¹⁰ When water is removed from the spaces between the particles in the sediment,

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⁵ 713 F. Supp. 2d at 1151.

⁶ 713 F. Supp. 2d at 1151; PI Transcript 187:22-25 (April 6, 2010).

⁷ See Erlewine Decl. (Doc. 816) at 3, Delta Smelt Consol. Cases (Feb. 2011).

⁸ Consolidated Delta Smelt Cases, 812 F. Supp. 2d 1133, 1182-87 (E.D. Cal. 2011); Leahigh 2nd Supplemental Declaration re X2 Injunction (Doc. 1006) ¶7, Consol. Delta Smelt Cases (Aug. 10, 2011); Erlewine X2 Declaration (Doc. 915) pp. 8-9, Consol. Delta Smelt Cases (June 16, 2011).

⁹ *Id.*

¹⁰ 713 F. Supp. 2d at 1153; Erlewine X2 Declaration (Doc. 915) pp. 9-11, Consol. Delta Smelt Cases (June 16, 2011).

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the soils compact, which reduces the volume for water storage.¹¹ Long-term impacts resulting from overdraft include land subsidence and damage to water conveyance facilities.¹²

Land subsidence is the sinking of the Earth's surface due to subsurface movement of earth materials. The major cause of subsidence in the southwestern United States is the overdrafting of aquifers. The negative effects of land subsidence include the permanent loss of groundwater storage space and changes in elevation and the slope of streams, canals, and drains.¹³ Additionally, in some areas where groundwater levels have declined, surface streams lose flow to adjacent groundwater systems.¹⁴ These losses entail significant impacts to hydrology, as well as the biological systems that depend on those groundwater or surface flows. In addition, land subsidence can lead to cracks and fissures at the land surface, which may damage bridges, roads, railroads, storm drains, sanitary sewers, canals, levees, and private and public buildings. Furthermore, land subsidence leads to the failure of well casings,¹⁵ which will require additional well drilling and attendant environmental impacts to air quality.

While urban areas are especially vulnerable to the damaging effects of subsidence, the largest occurrence of land subsidence in the world induced by human activity occurred in California's Central Valley. Prior to the commencement of CVP and SWP surface water imports to the San Joaquin Valley, parts of northwestern Fresno County experienced land subsidence of up to 30 feet as a result of groundwater overdraft in the area.¹⁶ Large portions of the Kern County groundwater basin also experienced subsidence due to overdraft of the aquifer and the lowering of its hydraulic head. In the San Joaquin River and Tulare Lake regions, for example, an area of 5,200 square miles registered at least 1 foot of subsidence.¹⁷ Land subsidence related to groundwater overdraft exceeded 12 feet in portions of Tulare County and 9 feet in the Arvin-Maricopa area.¹⁸

Since SWP and CVP operations commenced, imported water from the projects has largely eliminated widespread and large-scale subsidence. However, further loss of project water for export threatens to entirely reverse this trend. To the extent the new BiOps involve additional export restrictions, even more groundwater pumping will be required to meet demand, with attendant environmental impacts.¹⁹

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¹¹ Declaration of Russ Freeman (Doc. 170) at 5, *Consol. Salmonid Cases* (Jan. 27, 2010).

¹² 713 F.Supp. 2d at 1153; 812 F. Supp. 2d at 1187; Eriewine X2 Declaration (Doc. 915) pp. 9-11, *Consol. Delta Smelt Cases* (June 16, 2011); Declaration of Russ Freeman (Doc. 170) at 5-6, *Consol. Salmonid Cases* (Jan. 27, 2010).

¹³ Beck letter, *supra*, at p. 3; Leake, *supra*, at pp. 1-2.

¹⁴ Central Valley Project Improvement Act ["CVPIA"] Programmatic EIS ["PEIS"] (1997) at p. II-5.

¹⁵ Leake, *supra*, at pp. 1-2.

¹⁶ CVPIA PEIS, *supra*, at p. II-28.

¹⁷ *Id.* at pp. II-10, II-28.

¹⁸ *Id.* at pp. II-42, II-43.

¹⁹ Beck letter, *supra*, at p. 2.

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d. Increased Demand Upon Alternative Water Supplies Such As Local Surface Water, Local Groundwater, And Colorado River Water

Reduced SWP water supplies will result in increased reliance on Colorado River supplies, which are conveyed through Metropolitan Water District's Colorado River Aqueduct.²⁰ However, Colorado River supplies have been limited to a basic apportionment of 550,000 acre-feet per year, and they are generally high in salinity (averaging 700 mg/L of total dissolved solids (compared to SWP concentrations that range from 200-300 mg/L)).²¹ Thus, blending of SWP water is needed to make use of Colorado River supplies.

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e. Responding To Emergencies, Including Earthquakes, Wildfires

Lost surface and groundwater reserves due to reductions and shortages in project supplies additionally impact the ability to store water for dry years and emergencies. This reduced water storage makes areas across central and southern California increasingly vulnerable to emergencies such as wildfires, because less water is available to suppress and control wildfires and to respond to other emergencies.²²

If a severe earthquake occurred that disrupts or damages SWP infrastructure, inadequate surface and groundwater reserves would also put human health and safety at risk.²³ Furthermore, earthquake damage to levees inside the Delta could significantly disrupt Delta exports and cause the loss of millions of acre-feet of water, further constraining water supplies if adequate reserves are not replenished and maintained with adequate SWP and CVP supplies.²⁴

2. Land Use, Including Agriculture

Reduced project deliveries, and the resulting unavailability of adequate water supplies, will result in significant changes in land use. Related impacts include the removal of prime agricultural land from production, fallowing of land, loss of topsoil, shifts toward planting permanent crops, reduced production and yield of crops due to reduced water quality, increased costs to obtain supplemental water, and negative impacts to water management plans that act as source documents for evaluating land use projects.

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a. Fallowing Land And Taking Prime Agricultural Land Out Of Production

The federal district court in the *Consolidated Salmonid Cases* found that evidence was established that water losses caused by the NMFS BiOp's RPA would result in a variety of adverse impacts to the human environment, including "irretrievable resource losses" from the

²⁰ MWD (Nov. 2008).

²¹ MWD (Nov. 2008).

²² See MWD (Nov. 2008); DWR, California's Drought, Water Conditions & Strategies to Reduce Impacts pp.16-17 (March 2009); Governor's Proclamation, State of Emergency-Water Shortage p.3 (Feb. 27, 2009).

²³ See MWD (Nov. 2008).

²⁴ DWR Delta Risk Management Strategy (Feb. 2009) available at http://www.water.ca.gov/floodmgmt/dsrmo/sab/dmsp/docs/drms_execsum_ph1_final_low.pdf.

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loss of "permanent crops, fallowed lands, destruction of family and entity farming businesses [and] social disruption and dislocation...."²⁵

Agricultural operations in Fresno County, Tulare County, Kern County, San Diego County, and other areas of the State rely on Delta water, and this supply of water has already been impaired by the prior BiOps, with concomitant environmental effects. Farmers have been forced to fallow hundreds and thousands of acres of prime agricultural land as a result of reduced water supplies and uncertainty regarding future water supply.²⁶ As previously noted, in the SWP service area, it takes approximately 3 acre-feet of water per acre to sustain a crop for a growing season.²⁷ In the CVP service area, it has been estimated that approximately 400 acres of land may remain out of production for every 1000 acre-feet of water lost.²⁸ Thus for any reductions in the water supply there will be commensurate reductions in the acreage of crops that can be sustained. Conversely, farmers anticipate that increased water allocations would mitigate anticipated damage to crops in proportion to the amount of water received.²⁹

b. Losing Top Soil Due To Erosion

The fallowing of land also leads to greater soil erosion from wind and water, which comprises an additional irretrievable resource loss.³⁰ Such actions may result in substantial soil erosion and loss of topsoil.³¹

c. Shift To Permanent Crops

Reductions in water supplies have resulted in changed farming practices, such that more permanent crops are grown.³² However, permanent crops carry an additional risk, because farmers cannot cut back further on the water supply without destroying the crops.³³

d. Salt Intolerance Limits Some Crops From Being Produced And Reduces Yields

In response to reduced surface water deliveries, farmers must increase their reliance on groundwater, which in many locations is an inferior water source due to its higher salinity.³⁴ Unfortunately, not all fields and crops can be irrigated with groundwater, and the increased soil salinity from irrigating with saline groundwater impacts the ability to grow certain salinity

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²⁵ 713 F. Supp. 2d at 1152; Declaration of Russ Freeman (Doc. 170) at 3, *Consol. Salmonid Cases* (Jan. 27, 2010).

²⁶ 713 F. Supp. 2d at 1152; Declaration of Russ Freeman (Doc. 170) at 3-4, *Consol. Salmonid Cases* (Jan. 27, 2010).

²⁷ 713 F. Supp. 2d at 1152.

²⁸ 713 F. Supp. 2d at 1152.

²⁹ 713 F. Supp. 2d at 1151.

³⁰ *Consolidated Salmonid Cases*, 688 F. Supp. 2d 1013, 1033-34 (E.D. Cal. 2010).

³¹ Beck letter, *supra*, at p. 3.

³² 713 F. Supp. 2d at 1151.

³³ 713 F. Supp. at 1151-52.

³⁴ 713 F. Supp. 2d at 1153; Declaration of Russ Freeman (Doc. 170) at 6, *Consol. Salmonid Cases* (Jan. 27, 2010).

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intolerant crops in those areas.³⁵ Because some crops are particularly sensitive to salinity concentrations, the use of high-salinity water may reduce the yields of these crops.³⁶

e. Increased Cost And Infeasibility Of Supplemental Water

Farmers would be required to make up for any shortfall in imported water deliveries by purchasing supplemental water at drastically increased costs, if such supplemental water is even available.³⁷

f. Impacts To Water Management Planning Related To Land Use

California law requires all urban water suppliers to prepare urban water management plans every five years to ensure adequate water supplies and for use as a source document for analyzing water supply issues for specific projects under SB 610, SB 221, and the California Environmental Quality Act. The plans must identify and discuss factors affecting current and projected water supplies and demand, and they must identify steps being taken to ensure availability and reliability of supplies. ESA regulatory restrictions that reduce water deliveries for the protection of fish species are one of the main constraints facing water suppliers for providing adequate supplies.³⁸ Therefore, development projects and land use planning decisions that depend on these plans will also be constrained by any future imported water supply reductions caused by the new BiOps.

3. Socioeconomics

Reduced Delta water supplies also cause socioeconomic impacts. In response to reduced water supplies, farmers fallow fields and this reduced agricultural productivity results in layoffs, reduced hours for agricultural employees, and increased unemployment in agricultural communities. Reduced agricultural productivity also has socioeconomic impacts for agriculture-dependent business and industries. In addition, the unavailability of stable and sufficient water supplies reduces farmers' ability to obtain financing and result in employment losses, due to the reduced acreage of crops that can be planted and the corresponding reduction in the amount of farm labor needed to manage that reduced acreage. Reduced project export water supplies and the resulting employment losses also cause cascading socioeconomic impacts in affected communities, including increased poverty, hunger, and crime, along with dislocation of families and reduced revenues for local governments and schools.

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³⁵ See 713 F. Supp. 2d at 1153; Declaration of Russ Freeman (Doc. 170) at 6, *Consol. Salmonid Cases* (Jan. 27, 2010).

³⁶ MWD (Nov. 2008); Declaration of Russ Freeman (Doc. 170) at 6, *Consol. Salmonid Cases* (Jan. 27, 2010).

³⁷ 713 F. Supp. 2d at 1151.

³⁸ Southern California Water Committee, Urban Water Management Plans Fact Sheet, available at http://www.socalwater.org/images/SCWC.UWMP_Fact_Sheet.9.21.11.pdf.

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a. Lack Of Ability To Obtain Financing

Water supply uncertainties interfere with farmers' abilities to secure financing for continuing their farming operations.³⁹ Reduced water availability from the projects frequently results in depletion of supplemental water supplies from local groundwater, which removes the additional water supplies that would be needed for obtaining financing for farming operations.⁴⁰ Additionally water constraints would lead to increased payments for supplemental water, which would further affect farmers' cash flows.⁴¹ These financial constraints affect hiring decisions, strain liquidity, and create difficulties for farmers in meeting their payroll obligations.⁴²

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b. Employment Losses And Resulting Community Impacts

Water supply losses can also be linked to unemployment and related sociological impacts, including poverty, hunger, and crime.⁴³ Regardless of the season, socioeconomic impacts are likely to result from reduced water supplies.⁴⁴ For example, the 2009 delivery reduction that resulted from implementing FWS's 2008 BiOp's RPA resulted in a loss of 9,091 jobs in the San Joaquin Valley, relative to the year 2005, most likely as a result of reduced agricultural acreage under production.⁴⁵ Even during wet years, reduced water supplies caused by imposing onerous RPAs can impact employment.⁴⁶

Increased project water allocations prevent layoffs to farm employees.⁴⁷ It was undisputed in the federal district court "that farm employees and their families have faced devastating losses due to reductions in the available water supply" and that severe impacts have occurred in the farm economy due to a combination of drought and diversion limitations from the BiOps.⁴⁸ The decrease in productive agricultural acres resulted in reduced employee hours, salaries, and positions, which had devastating effects on farm employees and their families.⁴⁹ The removal of 250,000 acres from production translated into the loss of approximately 4,200 permanent agricultural worker positions, with even more jobs lost in adjunct businesses, such as packing, processing, and other related services.⁵⁰ In spring 2010, it was estimated that wage losses in the agriculture industry would be as much as \$1.6 billion during that year.⁵¹

³⁹ 812 F. Supp. 2d at 1187; Stiefvater Declaration re X2 Injunction (Doc. 918) *Consol. Delta Smelt Cases* (June 16, 2011); Mettler Declaration re X2 Injunction (Doc. 919) *Consol. Delta Smelt Cases* (June 16, 2011); 713 F. Supp. 2d at 1152.

⁴⁰ 812 F. Supp. 2d at 1187-88.

⁴¹ 812 F. Supp. 2d at 1187-88.

⁴² 812 F. Supp. 2d at 1187-88.

⁴³ 812 F. Supp. 2d at 1188; Sunding Declaration re X2 (Docs. 916 & 986) *Consol. Delta Smelt Cases* (June 16, 2011 & July 15, 2011).

⁴⁴ 812 F. Supp. 2d at 1187-88; Sunding Declaration re X2 (Docs. 916) at 1, *Consol. Delta Smelt Cases* (June 16, 2011).

⁴⁵ 812 F. Supp. 2d at 1188.

⁴⁶ 812 F. Supp. 2d at 1188.

⁴⁷ 713 F. Supp. 2d at 1151; Declaration of Chris Hurd (Doc 171) at 3, *Consol. Salmonid Cases* (Jan. 27, 2010).

⁴⁸ 713 F. Supp. 2d at 1152; Declaration of Daniel G. Nelson (Doc 172) at 4, *Consol. Salmonid Cases* (Jan. 27, 2010).

⁴⁹ 713 F. Supp. 2d at 1152; Declaration of Chris Hurd (Doc 171) at 2, *Consol. Salmonid Cases* (Jan. 27, 2010).

⁵⁰ 713 F. Supp. 2d at 1152; Declaration of Russ Freeman (Doc 170) at 7, *Consol. Salmonid Cases* (Jan. 27, 2010).

⁵¹ 713 F. Supp. 2d at 1152; Declaration of Chris Hurd (Doc 171) at 3, *Consol. Salmonid Cases* (Jan. 27, 2010).

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Unemployment resulting from water delivery reductions has led to hunger in the impacted San Joaquin Valley communities. For example, one food bank serving Fresno, Madera, and Kings Counties estimated in 2010 that 435,000 people in the area did not have a reliable source of food, that hunger in these communities would continue to increase, and that at least 42,000 people served by the food bank in October 2009 were employed in the farm industry before losing their jobs.⁵²

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4 Environmental Justice

Although the impacts from reduced water supplies will have significant impacts on people and farmland throughout the state, the hardest hit areas will be in predominantly poor and minority communities—especially in the Central Valley where employment losses and environmental effects will be the most prevalent. These characteristics of the counties in the San Joaquin Valley are illustrated in the tables below, using data from the U.S. Census Bureau.⁵³

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County	Race/Ethnicity, percent of persons, 2010						
	White	Black	American Indian, Alaska Native	Asian	Native Hawaiian, Other Pacific Islander	Reporting 2+ Races	Hispanic or Latino Origin
Fresno	55.4	5.3	1.7	9.6	0.2	4.5	50.3
Kern	59.5	5.8	1.5	4.2	0.1	4.5	49.2
Kings	54.3	7.2	1.7	3.7	0.2	4.9	50.9
Madera	62.6	3.7	2.7	1.9	0.1	4.2	53.7
Merced	58.0	3.9	1.4	7.4	0.2	4.7	54.9
San Joaquin	51.0	7.6	1.1	14.4	0.5	6.4	38.9
Stanislaus	65.6	2.9	1.1	5.1	0.7	5.4	41.9
Tulare	60.1	1.6	1.6	3.4	0.1	4.2	60.5
California	57.6	6.2	1.0	13.0	0.4	4.9	37.6

County	Income, 2006 - 2010		
	Per Capita Money Income in Past 12 Months (2010 dollars)	Median Household Income	Persons below Poverty Level
Fresno	\$20,329	\$46,430	22.50%
Kern	\$20,100	\$47,089	20.60%
Kings	\$17,875	\$48,684	19.30%
Madera	\$18,724	\$46,039	19.30%
Merced	\$18,041	\$43,844	21.80%
San Joaquin	\$22,851	\$54,341	16.0%
Stanislaus	\$22,064	\$51,094	16.40%
Tulare	\$17,966	\$43,851	22.90%
California	\$29,188	\$60,883	13.70%

⁵² 713 F. Supp. 2d at 1153; Declaration of Dana Wilkie (Doc 173) *Consol. Salmonid Cases* (Jan. 27, 2010).

⁵³ Information gathered from the U.S. Census Bureau, at: <http://quickfacts.census.gov/qfd/states/06/06107.html>.

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This is even more apparent at the level of local communities within these counties. According to U.S. Census Bureau data, in Huron 96.6% of the population is of Hispanic or Latino origin, and 54.5% of the population is below poverty level. In Mendota, 96.6% of the population is of Hispanic or Latino origin, and 44.6% of the population is below poverty level. In Firebaugh, 91.2% of the population is of Hispanic or Latino origin, and 33.5% of the population is below poverty level. In 2009, each of these communities suffered severe dislocation as a result of water shortages brought about in significant part by ESA related restrictions on water supplies.

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5. Biological Resources, Including Fish, Wildlife, And Plant Species

Reduced delta water supplies will have impacts on biological resources, including the reduced ability to supply areas dependent on water supplies from the projects, including wetlands that are maintained, in part, by those supplies. An indirect impact of resulting reduced agricultural production will be the proliferation of weeds and other invasive species, which adversely affect other biological resources.

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The EIS will also have to determine and show whether there is any biological benefit to the listed species associated with the alternatives being evaluated. These issues need to be fully addressed in the EIS.

a. Lack Of Water For Wetlands And Species Outside The Delta

Although a biological opinion's purpose is to aid the recovery of listed species, if the expected new BiOps result in reduced project exports, there will also be a significant impact on other protected species, which impacts should be analyzed.

For example, the northwestern portion of Kern County is home to 14,000 acres of flooded water habitat, including the Kern National Wildlife Refuge, where migratory birds, including protected and listed species, nest and feed during the fall and winter. An additional 11,000 acres of recharge ponds are located in the Kern River fan area, which provides seasonal habitat during recharge cycles. These complexes depend on the fall and winter delivery of imported surface water to provide for migratory bird habitat. If the federal action significantly decreases water exports, no Delta water will be available to fill these ponds. Because local surface water supplies to fill the ponds are only available in locally wet years, curtailment of imported water deliveries for the purported benefit of salmonid and delta smelt species would result in the destruction of this habitat for other protected species.⁵⁴

Another example of protected and listed species that could be harmed is found within the boundaries of the Santa Clara Valley Water District—which receives water from both the SWP and CVP. Of the 163 miles of local streams used by Santa Clara for instream groundwater recharge, 129 miles are considered to be habitat for threatened or endangered species, including 32 species of plants, 50 species of wildlife, six amphibians, and three aquatic species listed as special status species under State or federal law. Local reservoirs, streams, and artificial recharge ponds provide habitat for 11 native species and 19 nonnative species of fish. Populations of protected steelhead trout are known to exist in Coyote Creek, Guadalupe River,

⁵⁴ Beck letter, *supra*, at p. 3.

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Stevens Creek, and San Francisquito Creek and their tributaries. Santa Clara's average in-stream flow releases for groundwater recharge are normally about 104,000 acre-feet. Project export restrictions could reduce these flow releases, which in turn could significantly impact these species.⁵⁵

Furthermore, in the San Joaquin Valley, there are protected oak woodlands that serve as habitat for many other sensitive species. These woodlands and the species they support rely on groundwater and would be injured by further drops in groundwater levels due to increased pumping in response to a curtailment of imported water deliveries.⁵⁶ Similar impacts would be felt on other protected species throughout the SWP and CVP service areas. These potential impacts to other listed species must be analyzed in the EIS.

b. Proliferation Of Weeds

Non-cultivated fallow fields can be excellent habitat for non-native weed species such as tumbleweeds (Russian thistle), which break from the soil and are transported with the wind. Proliferation of these weeds in turn "clog irrigation systems, are hazardous to automobile traffic, spread wildfires and harbor insect pests that transmit viruses to many vegetable crops."⁵⁷

c. Beneficial Effects On The Listed Delta Species

The EIS must analyze both adverse and beneficial effects.⁵⁸ Therefore, a discussion must also be included to show the beneficial effects of the action, if any, on the listed species. These statements must be objective, balanced, and substantiated with evidence.

6. Water Quality

Reduced imported water supplies impact water quality by reducing water agencies' abilities to blend lower quality water with the higher quality Delta water. For example, local water agencies' beneficial use of recycled water frequently requires blending. Increased reliance on groundwater supplies also affects water quality by drawing in unusable saline, poor quality water from areas adjacent to usable sources. Use of groundwater also impacts the water quality of surface water streams due to the leachates that are present in the groundwater that becomes runoff into local streams.

a. Need For High Quality Delta Water For Blending

Because of varying levels of quality in the water sources available, some water agencies must manage the salinity of the water they provide in order to maximize water use and meet the

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⁵⁵ See Declaration of Joan Maher in Reply to Proposal on Interim Remedy, *NRDC v. Kemphorne*, No. 1:05-cv-1207-OWW-LJO ¶ 17 (Aug. 10, 2007).

⁵⁶ Beck letter, *supra*, at p. 3.

⁵⁷ Lincoln Smith, Biological Control of Russian Thistle (Tumbleweed) (2008) http://www.cwss.org/proceedingsfiles/2008/90_2008.pdf.

⁵⁸ Ron Bess, *The NEPA Book* p 110 (2001); 40 C.F.R. § 1508.8 ("Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.")

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demands for drinking water of the citizens they serve. Water from the Delta, which is of high quality, is necessary to allow for the utilization of other water supplies. For example, Delta water is frequently mixed with lower quality water from other sources before it is provided to Southern California residents for drinking and agricultural uses. The saline geology in the Colorado River Basin causes water from that source to generally be high in total dissolved solids, averaging about 700 mg/L. By contrast, SWP supplies tend to have low TDS concentrations in the range of 200-300 mg/L.⁵⁹ Because Colorado River water is highly saline, State Contractor member agencies that use Colorado River water, including Metropolitan, must blend that water with higher quality SWP water in order for the Colorado River water to be usable for drinking water uses or for water banking.⁶⁰

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Metropolitan's blending practices provide an example of the necessity of high quality SWP water deliveries. Metropolitan has adopted a policy to achieve blends of these source waters that do not exceed TDS concentrations of 500 mg/L. Metropolitan adopted this standard because salinities higher than this level would increase service costs, decrease the amount of water available, and reduce operating flexibility. For example, high salinity water has a residential impact resulting from the increased degradation of water heaters and other plumbing fixtures. Further, direct treatment of saline water without blending is costly and typically results in losses of up to 15 percent of the water processed. In addition, water with a high salinity content results in more saline wastewater, which lowers its usefulness and increases the costs of treating and utilizing recycled water.⁶¹ If low salinity water is not available, membrane treatment must be used, which result in losses of up to 15 percent of the water processed and increased costs.⁶²

Unless higher salinity water is treated or blended, it will affect agricultural use and degrade the quality of soils in their service areas. In addition, degradation of the water available for groundwater recharge could limit the use of local groundwater basins for storage due to the inability to meet basin plan water quality objectives established by the RWQCBs. Thus, when SWP supply water is inadequate to blend with more saline Colorado River water supplies, imported Colorado River water cannot be used to recharge groundwater basins without concern for compromising the water quality objectives of the groundwater basins.⁶³ This would exacerbate the impacts to groundwater caused by any water curtailments required by the action.⁶⁴

b. Inability To Use Recycled Water

Groundwater basins within the service areas of some of the SWC's member agencies are recharged with recycled water, thereby reducing the demand for imported water. However, each cycle of urban use of recycled water typically adds 250 to 400 milligrams per liter ("mg/L") of total dissolved solids ("TDS"). When wastewater flows already have high salinity concentrations, the use of recycled water becomes more limited or will require much more

⁵⁹ Metropolitan, *Impacts of Loss of SWP Supplies*, *supra*, at p. 1.

⁶⁰ Andreu, John T., *Water Quality, California, 2004: California Water Plan Update 2005*, at pp. 21-22.

⁶¹ Metropolitan, *Impacts of Loss of SWP Supplies*, *supra*, at p. 1; CVPIA PEIS, *supra*, at p. 11-16, attached hereto and made a part hereof.

⁶² Metropolitan, *Impacts of Loss of SWP Supplies*, *supra*, at p. 1.

⁶³ Metropolitan, *Impacts of Loss of SWP Supplies*, *supra*, at p. 3.

⁶⁴ Metropolitan, *Impacts of Loss of SWP Supplies*, *supra*, at p. 1.

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expensive treatment. Consequently, more and more high quality blend water is required to render this recycled water usable for groundwater recharge and other activities. Some Regional Water Quality Control Boards of the State of California ("RWQCBs") have adopted water quality control plans for groundwater basins within their jurisdictions that include water quality objectives for maximum amounts of TDS. When inadequate amounts of high-quality SWP or CVP blend water are available to meet the water quality requirements of RWQCB orders for recycled water recharge, recycled water cannot be used for recharge and member agencies must consequently defer, or abandon, water recharge efforts. Loss of high quality water to blend with recycled water for recharge thus contributes to additional groundwater recharge losses and the growing overdraft of groundwater basins in Southern California and the San Joaquin Valley.⁶⁵

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Recycled water is also frequently used for landscape and agricultural irrigation, as well as industrial applications. However, such reuse becomes problematic at TDS concentrations of more than 1,000 mg/L. Some crops are also particularly sensitive to high TDS concentrations, and the use of high salinity recycled water may reduce the yields of these crops. In addition, concern for water quality in groundwater basins may lead to restrictions on the use of recycled water for irrigation on lands overlying those basins. In the past, reduced SWP supplies have been responsible for increased total dissolved solids concentrations in Metropolitan's blends, which has resulted in documented impacts to Metropolitan's ability to utilize recycled water and provide replenishment service to groundwater basins.⁶⁶ Further reductions in delivered SWP and CVP supplies would result in even greater impacts of this type in Metropolitan's and other service areas.⁶⁷

c. Increased Infiltration Of Poor Quality Water In The San Joaquin Valley

In the San Joaquin Valley, there are large areas of saline, poor quality groundwater adjacent to usable, higher quality groundwater.⁶⁸ When replenishment of groundwater is reduced, higher quality groundwater levels are drawn down and cause the poor-quality groundwater to be intermixed with good-quality groundwater, thus leading to significant groundwater quality impacts.⁶⁹

d. Runoff Affects Streams

There could also be potential impacts to local streams and wildlife caused by the heavier reliance upon water groundwater for irrigation.⁷⁰ Selenium levels are often high in runoff from farms due to concentrations found in the groundwater.⁷¹

⁶⁵ Metropolitan, *Impacts of Loss of SWP Supplies*, *supra*, at p. 3.

⁶⁶ Metropolitan, *Impacts of Loss of SWP Supplies*, *supra*, at p. 4.

⁶⁷ Metropolitan, *Impacts of Loss of SWP Supplies*, *supra*, at p. 3.

⁶⁸ 812 F. Supp. 2d at 1187.

⁶⁹ 812 F. Supp. 2d at 1187.

⁷⁰ 688 F. Supp. 2d at 1033-34.

⁷¹ See, e.g., Reclamation, Grassland Bypass Project, <http://www.usbr.gov/mp/grassland/>.

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7. Air Quality

Reduced delta water supplies impact air quality in areas that can no longer sustain the same acreage of agricultural crops because of the increased dust and particulate emissions resulting from land fallowing. There will also be emission impacts related to the greater amount of energy that is needed for groundwater well pumps to lift water from a lower depth due to the greater reliance on groundwater reserves.

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a. Dust From Fallowing

Water losses caused by reduced project exports can result in air quality reduction because fallowing land increases the levels of airborne dust and particulate matter.⁷⁴ Non-irrigated fields in this semi-arid region can often produce dust during frequent wind events that occur throughout the region compounding the already significant number of respiratory ailments associated with the San Joaquin Valley such as asthma. Increased airborne dust also increases the risk of exposure to a fungus that lives in the San Joaquin Valley soils, which causes the infection commonly referred to as "Valley Fever." Valley Fever typically causes an infection in the lungs but in some cases, the infection spreads throughout the body and can cause death.

The San Joaquin valley is designated as nonattainment for PM 2.5 and PM 10 under state standards, and for PM 2.5 under federal standards.⁷⁵ Those conditions are worsened by dust emissions resulting from water shortages. For example, additional fallowing and under-irrigation of agricultural lands that could result in Kern County Water Agency, one of the SWC member agencies, due to further restrictions on Delta exports could add hundreds of tons per year of wind-borne particulates in the air in the San Joaquin air basin.⁷⁴ The same emission effect occurs from reductions in CVP water supplies to members of the SLDMWA that serve agricultural uses.

As one study explained: "Wind-blown fugitive dust is a widespread problem in the arid west resulting from land disturbance or abandonment and increasingly limited water supplies. Soil-derived particles obstruct visibility, cause property damage and contribute to violations of health-based air quality standards for fine particles (PM-10). These dry lands are often difficult to revegetate, yet they may require immediate stabilization. ... As the forces exerted by the wind overcome the forces that bind soil particles to the surface, soil loss occurs. Dislodged soil particles may roll across the surface (creep), or they may bounce (saltation), dislodging further particles with each impact. This process leads to a cascade effect resulting in massive emissions of dust. Fugitive dust affects crops and native vegetation by abrading and burying plants and by blocking sunlight."⁷⁵

In addition to addressing such impacts under NEPA, Reclamation and the other federal agencies involved here must comply with the federal Clean Air Act, 42 U.S.C. § 7401 et seq.

⁷² 713 F.Supp. 2d at 1152; Declaration of Russ Freeman (Doc 170) at 7-8, *Consol. Salmond Cares* (Jan. 27, 2010).

⁷³ San Joaquin Valley Unified Air Pollution Control District, <http://www.valleyair.org/acinfo/attainment.htm>.

⁷⁴ Beck letter, *supra*, at p. 3.

⁷⁵ *California Agriculture* 52(4):14-18. DOI: 10.3733/ca.v052n04p14. July-August 1998.

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Among other requirements, no federal agency is permitted to engage in an activity that does not conform to an implementation plan. 42 U.S.C. § 7506.

b. Emissions From Pumping Lift Increases

Increased reliance on groundwater reserves for water supplies also results in increased energy use due to increased pumping lift needed to access deeper groundwater.⁷⁶

8. Soils, Geology, And Mineral Resources

Reduced Delta water supplies could impact soils, geology, and mineral resources, by causing, for example: 1) groundwater overdraft and the resulting subsidence of the soil; 2) the fallowing of lands and the resulting loss of topsoil; and 3) increased reliance on lower quality saline groundwater sources and the resulting increase in soil salinity.

a. Subsidence

As previously noted, surface water shortages and corresponding increases in groundwater usage lead to groundwater overdraft, which occurs when pumping exceeds the safe yield of an aquifer.⁷⁷ When water is removed from the spaces between sediments, the soil compact and lose their volume.⁷⁸ Long-term impacts resulting from overdraft include land subsidence and damage to infrastructure, including water conveyance facilities.⁷⁹

b. Loss Of Topsoil

As discussed above, fallowing land increases the levels of airborne dust and particulate matter, which thus results in greater erosion and loss of topsoil resources from prime agricultural land.⁸⁰

c. Increased Reliance On Groundwater Degrades The Quality Of The Soil

As previously noted, increased reliance on groundwater reduces the quality of water applied to the soil because groundwater is often more saline than surface water supplies and the application of groundwater, in turn, increases soil salinity.⁸¹ This increased salinity in the soil degrades the quality of the soil for use in agriculture because it impacts the ability to grow certain salinity intolerant crops in those areas and affects the yield of many other crops.⁸²

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⁷⁶ 812 F. Supp. 2d at 1187; Declaration of Russ Freeman (Doc. 170) at 6, *Consol. Salmonid Cases* (Jan. 27, 2010).

⁷⁷ 713 F. Supp. 2d at 1153.

⁷⁸ Declaration of Russ Freeman (Doc. 170) at 5, *Consol. Salmonid Cases* (Jan. 27, 2010).

⁷⁹ 713 F. Supp. 2d at 1153; 812 F. Supp. 2d at 1187.

⁸⁰ 713 F. Supp. 2d at 1152.

⁸¹ 713 F. Supp. 2d at 1153; Declaration of Russ Freeman (Doc. 170) at 6, *Consol. Salmonid Cases* (Jan. 27, 2010).

⁸² See 713 F. Supp. 2d at 1153; MWD (Nov. 2008); Declaration of Russ Freeman (Doc. 170) at 6, *Consol. Salmonid Cases* (Jan. 27, 2010).

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9. Visual, Scenic, Or Aesthetic Resources

Aesthetics will be impacted from reduced water supplies due to urban decay from socioeconomic impacts, barren and decaying farmland, damage to infrastructure from subsidence, and lower reservoirs and water levels in the upper watersheds.

a. Urban Decay Due To Economic Problems

As previously noted, socioeconomic impacts would result from reduced water supplies. A by-product of resulting poverty would be urban decay in many centers where displaced workers live.

b. Fallowed Land, Dead Crops, Destruction Of Permanent Orchard Crops

As also noted, reduced water supplies result in fallowed land and destruction of permanent orchard crops.⁸³ In these areas, an otherwise healthy and vibrant landscape, will be replaced with barren and desolate ground, potentially covered with dying or decaying plants.

c. Damage From Subsidence

Overdraft of groundwater reserves can result in land subsidence, which can also result in unsightly damage to infrastructure, including water conveyance facilities.⁸⁴

d. Lowering Of Reservoirs, Lack Of Flows In Upper Watersheds

Restrictions that call for additional, episodic releases from reservoirs in the upper watershed,⁸⁵ have potential to substantially alter upper watershed aesthetics by lowering reservoir levels and reducing releases and flows that otherwise would have occurred throughout the year.

10. Global Climate Change, Transportation, And Recreation

Reduced water supplies can impact climate change, due to greater energy being needed and reduce carbon uptake by plants. Transportation can be impacted by greater impediments from blowing dust, tumbleweeds, and bird-on-aircraft strikes. Recreation impacts are also likely due to impacts to reservoir and upper watershed flows.

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⁸³ 713 F. Supp. 2d at 1151-52.

⁸⁴ 713 F. Supp. 2d at 1153; 812 F. Supp. 2d at 1187; *Erlewine X2 Declaration* (Doc. 915) pp. 9-11, *Consol. Delta Smelt Cases* (June 16, 2011); *Declaration of Russ Freeman* (Doc. 170) at 5-6, *Consol. Salmonid Cases* (Jan. 27, 2010).

⁸⁵ See, e.g., 812 F. Supp. 2d at 1187.

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a. Climate Change

Increased reliance on groundwater reserves for water supply will result in increased energy usage due to increased pumping lifts needed to access deeper groundwater.⁸⁶

Land fallowing that results from failing to obtain sufficient water allocations to plant crops will also reduce the amount of carbon sequestration that would have otherwise occurred by planting crops, and would have thereby removed carbon dioxide and other greenhouse gases from the atmosphere.⁸⁷

In addition, use of hydroelectric power in California avoids over 29 million metric tons of carbon pollution each year—equal to the output of over 5.5 million passenger cars.⁸⁸ Because of the operational changes to project reservoir releases, reservoir carryover, and Delta export pumping needed for meeting flow requirements, there is potential for drastic changes in the timing and magnitude of project hydropower generation. This impacts the availability and cost of clean electricity, and it also requires energy managers to rely on unclean sources of electricity.

b. Transportation

Increased wind-blown and aerosolized dust and particulate matter from land fallowing, as previously discussed above, in turn impairs major transportation routes throughout the Central Valley.⁸⁹

Fallowing can also increase the incidence of bird-on-aircraft strikes, which impacts air transportation for both domestic and national security purposes.⁹⁰

Fallowed fields are an excellent habitat for tumbleweeds (Russian thistle), which break from the soil and are transported with the wind.⁹¹ Proliferation of these species can hamper highways and canals, among other deleterious effects.⁹²

c. Recreation

Lower reservoir levels affect recreation. Restrictions that call for additional, episodic releases from reservoirs in the upper watershed⁹³ have the potential to substantially alter usability of the upper watershed for recreational purposes by reducing releases and flows that otherwise

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⁸⁶ 812 F. Supp. 2d at 1183; Declaration of Russ Freeman (Doc. 170) at 6, *Consol. Salmonid Cases* (Jan. 27, 2010).

⁸⁷ See 812 F. Supp. 2d at 1187.

⁸⁸ *Risks Ahead: Flows and the Delta: The Consequences of Using a One-Dimensional Approach to Address a Complex Problem*, p.6 (March 2012), Hydrologic Modeling Results and Estimated Potential Hydropower Effects Due to the Implementation of the Sacramento Water Resources Control Board Delta Flow Criteria, December 2011, http://www.sfcwa.org/category/programs/delta_governance_water_management/.

⁸⁹ 713 F. Supp. 2d at 1152; Declaration of Russ Freeman (Doc. 170) at 7-8, *Consol. Salmonid Cases* (Jan. 27, 2010).

⁹⁰ 713 F. Supp. 2d at 1152.

⁹¹ Lincoln Smith, Biological Control of Russian Thistle (Tumbleweed) (2008) http://www.cwss.org/proceedingsfiles/2008/90_2008.pdf.

⁹² Lincoln Smith, Biological Control of Russian Thistle (Tumbleweed) (2008) http://www.cwss.org/proceedingsfiles/2008/90_2008.pdf.

⁹³ See, e.g., 812 F. Supp. 2d at 1183.

Appendix 1C: Comments from Regional and Local Agencies and Responses

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would have occurred throughout the year, and lowering reservoir levels throughout the projects' service areas.⁹⁴ Reduced water levels in these areas disrupt recreation and impact entire recreation-based industries that rely on visitors in upper watershed regions such as Shasta, Folsom, and Oroville Reservoirs.⁹⁵

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⁹⁴ Risks Ahead: Flows and the Delta: The Consequences of Using a One-Dimensional Approach to Address a Complex Problem, p.7 (March 2012); Hydrologic Modeling Results and Estimated Potential Hydropower Effects Due to the Implementation of the Sacramento Water Resources Control Board Delta Flow Criteria, December 2011, http://www.sfcwa.org/category/programs/delta_governance_water_management/.

⁹⁵ Risks Ahead: Flows and the Delta: The Consequences of Using a One-Dimensional Approach to Address a Complex Problem, p.7 (March 2012); Hydrologic Modeling Results and Estimated Potential Hydropower Effects Due to the Implementation of the Sacramento Water Resources Control Board Delta Flow Criteria, December 2011, http://www.sfcwa.org/category/programs/delta_governance_water_management/.

1C.1.13.1 Responses to Comments from San Luis & Delta-Mendota Water Authority, Westlands Water District, and San Joaquin River Exchange Contractors Water Authority

SLDMWA WWD SJRECWA 1: Comment noted.

SLDMWA WWD SJRECWA 2: The EIS presents a range of alternatives for the future coordinated long-term operation of the CVP and SWP that provide a variety of methods to avoid jeopardy to the continued existence of the species, or avoid destruction or adverse effects to their critical habitat.

On October 9, 2015, the District Court granted a very short time extension to address comments received during the public review period, and requires Reclamation to issue a Record of Decision on or before January 12, 2016. This current court ordered schedule does not provide sufficient time for Reclamation to include additional alternatives, which would require recirculation of an additional Draft EIS for public review and comment, nor does Reclamation believe additional analysis is required to constitute a sufficient EIS. Reclamation is committed to continue working toward improvements to the USFWS and NMFS RPA actions through either the adaptive management process, Collaborative Science and Adaptive Management Program (CSAMP) with the Collaborative Adaptive Management Team (CAMT), or other similar ongoing or future efforts.

SLDMWA WWD SJRECWA 3: Reclamation is committed to continue working toward improvements to the USFWS and NMFS RPA actions through either the adaptive management process, Collaborative Science and Adaptive Management Program (CSAMP) with the Collaborative Adaptive Management Team (CAMT), or other similar ongoing or future efforts. The EIS provides a comparison of projected adverse effects and benefits of Alternatives 1 through 5 and the No Action Alternative. The EIS also provides a comparison of conditions of the No Action Alternative and Alternatives 1 through 5 and the Second Basis of Comparison. The NEPA analysis does not determine if the alternatives would change the findings of the biological opinions in the determination of the likelihood of the alternatives to cause jeopardy to the continued existence of the species, or destroy or adversely affect their critical habitat.

SLDMWA WWD SJRECWA 4: As described in Section 3.3, Reclamation had provisionally accepted the provisions of the 2008 USFWS BO and 2009 NMFS BO, and was implementing the BOs at the time of publication of the Notice of Intent in March 2012. Under the definition of the No Action Alternative in the National Environmental Policy Act regulations (43 CFR 46.30), Reclamation's NEPA Handbook (Section 8.6), and Question 3 of the Council of Environmental Quality's Forty Most Asked Questions, the No Action Alternative could represent a future condition with "no change" from current management direction or level of management intensity, or a future "no action" conditions without implementation of the actions being evaluated in the EIS. The No Action Alternative in this EIS is consistent with the definition of "no change" from current management direction or level of management. Therefore, the RPAs were included in the No Action Alternative as Reclamation had been implementing the BOs and RPA actions, except where enjoined, as part of CVP operations for

approximately three years at the time the Notice of Intent was issued (2008 USFWS BO implemented for three years and three months, 2009 NMFS BO implemented for two years and nine months).

As described in Section 3.3, Reclamation included the Second Basis of Comparison to identify changes that would occur due to actions that would not have been implemented without Reclamation's provisional acceptance of the BOs, as required by the District Court order. However, the Second Basis of Comparison is not consistent with the definition of the No Action Alternative used to develop the No Action Alternative for this EIS. Therefore, mitigation measures have not been considered for changes of alternatives as compared to the Second Basis of Comparison.

The No Action Alternative represents operations consistent with implementation of the 2008 and 2009 Biological Opinions. This No Action Alternative represents the current management direction and level of management intensity consistent with the explanation of the No Action Alternative included in Council of Environmental Quality's Forty Most Asked Questions (Question 3). NEPA does not require agencies to mitigate impacts, nor does it require agencies to identify mitigation associated with the No Action Alternative.

Reclamation has a legal obligation to comply with the ESA. Section 7 requires Reclamation to insure that actions it authorizes, funds or carries out do not jeopardize the continued existence of any listed species and do not destroy or adversely modify designated critical habitat. This legal obligation was confirmed in the Central Valley Project Improvement Act. Most of Reclamation's contracts with CVP water users limit Reclamation's liability for shortages associated with meeting legal obligations of the CVP. Additionally, Section 9 of the ESA prohibits unauthorized take of listed species. DWR has chosen to ensure its compliance with the ESA through coordinated operation of the SWP with the CVP to implement the 2008 USFWS BO and 2009 NMFS BO.

Reclamation recognizes that some CVP water users either have initiated or are initiating programs to increase water supplies with separate environmental documentation (see Appendix 5D, Municipal and Industrial Water Demands and Supplies). Other CVP water users may implement future projects to increase water supplies, such as construction and operation of a desalination plants and water recycling programs. None of these future actions are currently authorized and are not being proposed by Reclamation as a part of this decision. Adoption of any of these types of these future actions, if authorized and funded by Reclamation, would require additional analysis under NEPA.

SLDMWA WWD SJRECWA 5: The SWAP model, a regional agricultural production and economic optimization model that simulates the decisions of farmers across 93 percent of agricultural land in California, was used to determine changes in agricultural land use and employment based upon changes in CVP and SWP water deliveries and cost-effective water supplies. This model is described in Appendix 12A, Statewide Agricultural Production Model (SWAP) Documentation. The SWAP model simulates changes in Year 2030 based upon

1 economic optimization factors related to crop selection, water supplies, and other
2 factors to maximize profits with consideration of resource constraints, technical
3 production relationships, and market conditions. The model indicated that even
4 with the cost of groundwater pumping from greater depths, the overall agricultural
5 production could be maintained. The EIS evaluates changes in 2030 under the
6 alternatives discussed Chapter 5 through 21 of the EIS.

7 It should be noted that Figures 7.15 through 7.60 in Chapter 7, Groundwater
8 Resources and Groundwater Quality, have been modified in the Final EIS to
9 correct an error that increased the changes in groundwater elevation by a factor of
10 3.25. This miscalculation was due to an error in a model post-processor that
11 generates the figures related to changing the values from CVHM Model output
12 from meters to feet. Therefore, the results in these figures and the related text in
13 Chapter 7 are less than reported in the Draft EIS. The figures and the text have
14 been revised in the Final EIS. No changes are required to the CVHM model. The
15 revised results in the figures and the text in Chapter 7 are consistent with the
16 findings of the SWAP model.

17 **SLDMWA WWD SJRECWA 6:** Please see response to Comment SLDMWA
18 WWD SJRECWA 32.

19 **SLDMWA WWD SJRECWA 7:** The No Action Alternative and Alternative 5
20 consider actions from both the 2008 USFWS BO and the 2009 NMFS BO in an
21 integrated manner. This EIS was prepared in response to a court order requiring
22 NEPA analysis on the environmental impacts of accepting and implementing the
23 RPA actions. The opportunity to integrate future biological opinions that would
24 meet the needs of both Delta Smelt and salmonids species lies with the agencies
25 responsible for developing those opinions; namely USFWS and NMFS. If
26 implementation of future biological opinions require it, Reclamation will conduct
27 a NEPA review of those future actions.

28 The No Action Alternative represents operations consistent with implementation
29 of the 2008 and 2009 Biological Opinions. This No Action Alternative represents
30 the current management direction and level of management intensity consistent
31 with the explanation of the No Action Alternative included in Council of
32 Environmental Quality's Forty Most Asked Questions (Question 3). NEPA does
33 not require agencies to mitigate impacts, nor does it require agencies to identify
34 mitigation associated with the No Action Alternative.

35 **SLDMWA WWD SJRECWA 8:** Please see responses to Comments SLDMWA
36 WWD SJRECWA 12 to SLDMWA WWD SJRECWA 63.

37 **SLDMWA WWD SJRECWA 9:** On October 9, 2015, the District Court granted
38 a very short time extension to address comments received during the public
39 review period, and requires Reclamation to issue a Record of Decision on or
40 before January 12, 2016. Reclamation has modified the Final EIS in response to
41 comments from SLDMWA WWD SJRECWA and other commenters; and will
42 use the Final EIS in the development of the Record of Decision.

- 1 **SLDMWA WWD SJRECWA 10:** Please see responses to Comments
2 SLDMWA WWD SJRECWA 64 to SLDMWA WWD SJRECWA 147.
- 3 **SLDMWA WWD SJRECWA 11:** Comment noted.
- 4 **SLDMWA WWD SJRECWA 12:** As discussed in response to Comment
5 SLDMWA WWD SJRECWA 3, the EIS provides a comparison of projected
6 adverse effects and benefits of Alternatives 1 through 5 and the No Action
7 Alternative. The EIS also provides a comparison of conditions under the No
8 Action Alternative and Alternatives 1 through 5 with the Second Basis of
9 Comparison. As described in Section 3.3, Reclamation included the Second Basis
10 of Comparison to identify changes that would occur due to actions that would not
11 have been implemented without Reclamation's provisional acceptance of the
12 BOs, as required by the District Court order.
- 13 The NEPA analysis does not determine if the alternatives would change the
14 findings of the biological opinions in the determination of the likelihood of the
15 alternatives to cause jeopardy to the continued existence of the species, or destroy
16 or adversely affect their critical habitat. Reclamation is committed to continue
17 working toward improvements to the USFWS and NMFS RPA actions through
18 either the adaptive management process, Collaborative Science and Adaptive
19 Management Program (CSAMP) with the Collaborative Adaptive Management
20 Team (CAMT), or other similar ongoing or future efforts.
- 21 **SLDMWA WWD SJRECWA 13:** The analysis in the EIS compares conditions
22 under Alternatives 1 through 5 with the No Action Alternative to identify
23 beneficial and adverse impacts for a broad range of physical, environmental, and
24 human resources. The NEPA analysis does not determine if the alternatives
25 would change the findings of the biological opinions in the determination of the
26 likelihood of the alternatives to cause jeopardy to the continued existence of the
27 species, or destroy or adversely affect their critical habitat.
- 28 **SLDMWA WWD SJRECWA 14:** The initial Proposed Action was defined in
29 the Notice of Intent, and is represented in Alternative 2 in the EIS. The Preferred
30 Alternative is described in Section 1.5 of Chapter 1, Introduction, of the Final
31 EIS. The Environmentally Preferred Alternative will be identified and disclosed
32 in the Record of Decision, as required by the CEQ regulations.
- 33 **SLDMWA WWD SJRECWA 15:** As described in Section 3.3, Reclamation had
34 provisionally accepted the provisions of the 2008 USFWS BO and 2009 NMFS
35 BO, and was implementing the BOs at the time of publication of the Notice of
36 Intent in March 2012. Under the definition of the No Action Alternative in the
37 National Environmental Policy Act regulations (43 CFR 46.30), Reclamation's
38 NEPA Handbook (Section 8.6), and Question 3 of the Council of Environmental
39 Quality's Forty Most Asked Questions, the No Action Alternative could represent
40 a future condition with "no change" from current management direction or level
41 of management intensity, or a future "no action" conditions without
42 implementation of the actions being evaluated in the EIS. The No Action
43 Alternative in this EIS is consistent with the definition of "no change" from
44 current management direction or level of management. Therefore, the RPAs were

included in the No Action Alternative as Reclamation had been implementing the BOs and RPA actions, except where enjoined, as part of CVP operations for approximately three years at the time the Notice of Intent was issued (2008 USFWS BO implemented for three years and three months, 2009 NMFS BO implemented for two years and nine months).

As described in Section 3.3, Reclamation included the Second Basis of Comparison to identify changes that would occur due to actions that would not have been implemented without Reclamation's provisional acceptance of the BOs, as required by the District Court order. However, the Second Basis of Comparison is not consistent with the definition of the No Action Alternative used to develop the No Action Alternative for this EIS. Therefore, mitigation measures have not been considered for changes of alternatives as compared to the Second Basis of Comparison.

SLDMWA WWD SJRECWA 16: As described in Section 3.3.1.2 of Chapter 3, Description of Alternatives, several actions included in the 2008 USFWS BO and 2009 NMFS BO address items that were underway prior to publication of the BOs, as summarized below.

- 2008 USFWS BO RPA Component 4, Habitat Restoration.
 - In 1987, Reclamation, DWR, CDFW, and the Suisun Resource Conservation District (SRCD) signed the Suisun Marsh Preservation Agreement (SMPA), which contains provisions for Reclamation and DWR to mitigate the adverse effects on Suisun Marsh channel water salinity from the CVP and SWP operations and other upstream diversions. The SMPA required Reclamation and DWR to prepare a timeline for implementing the Plan of Protection for the Suisun Marsh and delineate monitoring and mitigation requirements. In 2001, Reclamation, DWR, USFWS, NMFS, CDFW, SRCD, and CALFED directed the formation of a charter group to develop a plan for Suisun Marsh that would balance the needs of CALFED, the SMPA, and other plans by protecting and enhancing existing land uses, existing waterfowl and wildlife values including those associated with the Pacific Flyway, endangered species, and CVP and SWP water project supply quality. In 2014, Reclamation, CDFW, and USFWS adopted and initiated implementation of the Suisun Marsh Habitat Management, Preservation, and Restoration Plan (Suisun Marsh Management Plan). The USFWS and NMFS have issued biological opinions for the Suisun Marsh Management Plan.
 - The No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5 assumes that the Suisun Marsh Management Plan will provide up to 7,000 acres of intertidal and associated subtidal habitat in the Delta and Suisun Marsh with or without implementation of the 2008 USFWS BO. This would represent up to 87 percent (7,000 of 8,000 acres of this habitat type referenced in the 2008 USFWS BO under the No Action Alternative and Alternative 5.

- 1 • 2009 NMFS BO RPA Action I.1.3, Clear Creek Spawning Gravel
2 Augmentation.
 - 3 – This effort was initiated in 1996 under the CVPIA Section 3406(b)(12).
4 The Clear Creek fisheries habitat restoration program is being
5 implemented by USFWS and Reclamation in accordance with CVPIA
6 (Reclamation 2011a). By the year 2020 the overall goal is to provide
7 347,288 square feet of usable spawning habitat from Whiskeytown Dam
8 downstream to the former McCormick-Saeltzer Dam, which is the amount
9 that existed before construction of Whiskeytown Dam. Between 1996 and
10 2009, a total of approximately 130,925 tons of spawning gravel was added
11 to the creek. The interim annual spawning gravel addition target is 25,000
12 tons per year, but due to a lack of funding, only an average of 9,358 tons
13 has been placed annually since 1996 (Reclamation 2013a).
 - 14 – The No Action Alternative, Second Basis of Comparison, and
15 Alternatives 1 through 5 assume that the CVPIA program will continue
16 through 2030.
- 17 • 2009 NMFS BO RPA Action I.1.4, Spring Creek Temperature Control
18 Curtain Replacement.
 - 19 – In accordance with SWRCB Order 91-0, temperature control actions were
20 initiated in the 1990s, including construction of the Spring Creek
21 Temperature Control Curtain in 1993. The curtain was damaged and
22 replaced as part of maintenance activities for the CVP facilities in 2011.
 - 23 – This action was completed prior to publication of the Notice of Intent for
24 this EIS; therefore, this action is included in No Action Alternative,
25 Second Basis of Comparison, and Alternatives 1 through 5.
- 26 • 2009 NMFS BO RPA Action I.2.6, Restore Battle Creek for Winter-Run,
27 Spring-Run, and Central Valley Steelhead.
 - 28 – The Battle Creek Salmon and Steelhead Restoration Project was initiated
29 in the 1999 in accordance with the CVPIA Anadromous Fish Restoration
30 Program. An Agreement in Principle was signed by Reclamation, NMFS,
31 USFWS, CDFW, and Pacific Gas & Electric Company to pursue a
32 restoration project for Battle Creek. A formal Memorandum of
33 Understanding was signed in 1999 to provide funding for the program.
 - 34 – The program is consistent with provisions in the California State Salmon,
35 Steelhead Trout, and Anadromous Fisheries Program Act (California
36 Senate Bill 2261, 1990), CALFED Bay-Delta Ecosystem Restoration
37 Program Plan, Upper Sacramento River Fisheries and Riparian Habitat
38 Management Plan (developed in accordance with California Senate Bill
39 1086, 1989), 1990 CDFW Central Valley Salmon and Steelhead
40 Restoration and Enhancement Plan, 1990 CDFW Steelhead Restoration
41 Plan and Management Plan for California, 1993 CDFW Restoring Central
42 Valley Streams: A Plan for Action, NOAA 1997 Proposed Recovery Plan

- 1 for Sacramento River Winter-Run Chinook Salmon, and 1996 CDFW
2 Actions to Restore Central Valley Spring-Run Chinook Salmon.
- 3 – The Final EIS and the Record of Decision for the Battle Creek Salmon and
4 Steelhead Restoration Project were completed in July 2005 and January
5 2009, respectively.
- 6 – Construction was completed on the first phase in 2010. Construction will
7 be completed prior to 2030 to reestablish approximately 42 miles of
8 salmon and steelhead habitat on Battle Creek and an additional 6 miles of
9 habitat on tributaries. The project includes removal of five dams,
10 installation of new fish screens and fish ladders, provisions for increased
11 instream flows in Battle Creek, improved access roads and trails, and
12 decommissioned power plant canals that conveyed water between
13 tributaries.
- 14 – The Record of Decision and the funding agreements were completed prior
15 to publication of the 2009 NMFS BO. Construction was initiated prior to
16 publication of the Notice of Intent for this EIS, and is anticipated to be
17 complete before 2030. Therefore, this action is included in No Action
18 Alternative, Second Basis of Comparison, and Alternatives 1 through 5.
- 19 • 2009 NMFS BO RPA Action I.3.1, Operate Red Bluff Diversion Dam with
20 Gates Out.
- 21 – The Final EIS and Record of Decision were completed in May 2008 for
22 the Tehama-Colusa Canal Authority for the Tehama-Colusa Canal Fish
23 Passage Improvement Project which included construction of the new
24 intake at the Red Bluff Diversion Dam site and removal of the dam gates
25 from the Sacramento River water. This action was initiated following the
26 issuance of the 1993 NMFS BO that reduced the time that water could be
27 diverted from the Sacramento River using the Diversion Dam gates.
- 28 – Construction was initiated in March 2010 and funded by the 2009
29 American Recovery and Reinvestment Act. The new Red Bluff Pumping
30 Plant began operation in 2012, and the gates no longer block the flow of
31 water in the Sacramento River.
- 32 – These existing facilities are included in No Action Alternative, Second
33 Basis of Comparison, and Alternatives 1 through 5.
- 34 • 2009 NMFS BO RPA Action I.5, Funding for CVPIA Anadromous Fish
35 Screen Program.
- 36 – This effort was initiated over 20 years ago under the CVPIA Section
37 3406(b)(21).
- 38 – The No Action Alternative, Second Basis of Comparison, and Alternatives
39 1 through 5 assume continued implementation of the program until the
40 CVPIA program objectives are met which may or may not occur prior to
41 2030.

- 1 • 2009 NMFS BO RPA Action I.6.1, Restoration of Floodplain Habitat; and
2 Action I.6.2, Near-Term Actions at Liberty Island/Lower Cache Slough and
3 Lower Yolo Bypass; Action I.6.3, Lower Putah Creek Enhancements; Action
4 I.6.4, Improvements to Lisbon Weir; and Action I.7, Reduce Migratory
5 Delays and Loss of Salmon, Steelhead, and Sturgeon at Fremont Weir and
6 Other Structures in the Yolo Bypass.
7 – These actions are addressed in the ongoing Yolo Bypass Salmonid Habitat
8 Restoration and Fish Passage Implementation Plan (Implementation Plan)
9 that has been initiated by Reclamation and DWR.
10 – The No Action Alternative, Second Basis of Comparison, and Alternatives
11 1 through 5 assume completion of this Implementation Plan by 2030 with
12 or without implementation of the 2009 NMFS BO.
13 – In response to this comment, a sensitivity analysis was included in the
14 Final EIS (Appendix 5E), that presents the results of CalSim II model runs
15 with and without implementation of the Yolo Bypass Salmonid Habitat
16 Restoration and Fish Passage Implementation Plan.
17 • 2009 NMFS BO RPA Action II.1, Lower American River Flow Management.
18 – In 2006, Reclamation began operating in accordance with the American
19 River Flow Management Standard (FMS), as described in Appendix 3A,
20 No Action Alternative: Central Valley Project and State Water Project
21 Operations. The FMS operations were initiated to enhance the protections
22 provided by SWRCB D-893 in accordance with an agreement between
23 Reclamation, USFWS, NMFS, and CDFW.
24 – The No Action Alternative, Second Basis of Comparison, and Alternatives
25 1 through 5 assume continued operations under the FMS in 2030.
26 **SLDMWA WWD SJRECWA 17:** Reclamation was directed by the District
27 Court to remedy its failure to conduct a NEPA analysis when it accepted and
28 implemented the 2008 USFWS BO RPA and the 2009 NMFS BO RPA pursuant
29 to the Federal Endangered Species Act of 1973 (ESA) as amended (United States
30 Code [U.S.C.] 1531 ET SEQ.). The BOs did not address the Friant Division of
31 the CVP; therefore, the EIS does not address the Friant Division of the CVP.
32 **SLDMWA WWD SJRECWA 18:** Please see response to Comment SLDMWA
33 WWD SJRECWA 4.
34 **SLDMWA WWD SJRECWA 19:** Please see response to Comment SLDMWA
35 WWD SJRECWA 16.
36 **SLDMWA WWD SJRECWA 20:** As described in Section 3.3, Reclamation had
37 provisionally accepted the provisions of the 2008 USFWS BO and 2009 NMFS
38 BO, and was implementing the BOs at the time of publication of the Notice of
39 Intent in March 2012. Under the definition of the No Action Alternative in the
40 National Environmental Policy Act regulations (43 CFR 46.30), Reclamation's
41 NEPA Handbook (Section 8.6), and Question 3 of the Council of Environmental
42 Quality's Forty Most Asked Questions, the No Action Alternative could represent

1 a future condition with “no change” from current management direction or level
2 of management intensity, or a future “no action” conditions without
3 implementation of the actions being evaluated in the EIS. The No Action
4 Alternative in this EIS is consistent with the definition of “no change” from
5 current management direction or level of management. Therefore, the RPAs were
6 included in the No Action Alternative as Reclamation had been implementing the
7 BOs and RPA actions, except where enjoined, as part of CVP operations for
8 approximately three years at the time the Notice of Intent was issued (2008
9 USFWS BO implemented for three years and three months, 2009 NMFS BO
10 implemented for two years and nine months).

11 As described in Section 3.3, Reclamation included the Second Basis of
12 Comparison to identify changes that would occur due to actions that would not
13 have been implemented without Reclamation’s provisional acceptance of the
14 BOs, as required by the District Court order. However, the Second Basis of
15 Comparison is not consistent with the definition of the No Action Alternative
16 used to develop the No Action Alternative for this EIS. Therefore, mitigation
17 measures have not been considered for changes of alternatives as compared to the
18 Second Basis of Comparison.

19 The No Action Alternative represents operations consistent with implementation
20 of the 2008 and 2009 Biological Opinions. This No Action Alternative represents
21 the current management direction and level of management intensity consistent
22 with the explanation of the No Action Alternative included in Council of
23 Environmental Quality’s Forty Most Asked Questions (Question 3). NEPA does
24 not require agencies to mitigate impacts, nor does it require agencies to identify
25 mitigation associated with the No Action Alternative.

26 Reclamation has a legal obligation to comply with Section 7 of the ESA. Section
27 7 requires Reclamation to insure that actions it authorizes, funds or carries out do
28 not jeopardize the continued existence of any listed species and do not destroy or
29 adversely modify designated critical habitat. This legal obligation was confirmed
30 in the Central Valley Project Improvement Act. Most of Reclamation’s contracts
31 with CVP water users limit Reclamation’s liability for shortages associated with
32 meeting legal obligations of the CVP. Additionally, ESA prohibits unauthorized
33 take of listed species. DWR has chosen to ensure its compliance with the ESA
34 through coordinated operation of the SWP with the CVP and to implement the
35 2008 USFWS BO and 2009 NMFS BO.

36 Reclamation recognizes that some CVP water users either have initiated or are
37 initiating programs to increase water supplies with separate environmental
38 documentation (see Appendix 5D, Municipal and Industrial Water Demands and
39 Supplies). Other CVP water users may implement future projects to increase
40 water supplies, such as construction and operation of a desalination plants and
41 water recycling programs. None of these future actions are currently authorized
42 and are not being proposed by Reclamation as a part of this decision. Adoption of
43 any of these types of these future actions, if authorized and funded by
44 Reclamation, would require additional analysis under NEPA.

SLDMWA WWD SJRECWA 21: Please see response to Comment SLDMWA WWD SJRECWA 20.

SLDMWA WWD SJRECWA 22: The range of alternatives (Alternatives 1 through 5) was identified through consideration of concepts identified in the scoping process, through comments received during preparation of the EIS, and considerations by Reclamation. The concepts were evaluated with respect to screening criteria defined in the purpose of the action (see Chapter 2, Purpose and Need), a determination if the concept addressed one or more significant issues, and if the concept was included in one or more alternatives (see Table 3.1 in Chapter 3, Description of Alternatives). Two of the alternatives, No Action Alternative and Alternative 5, consider actions from both of the 2008 USFWS BO and 2009 NMFS BO in an integrated manner. This EIS was prepared in response to a court order requiring NEPA analysis on the environmental impacts of accepting and implementing the RPA actions. The opportunity to integrate future biological opinions that would meet the needs of both Delta Smelt and salmonids species lies with the agencies responsible for developing those opinions, namely USFWS and NMFS. If implementation of future biological opinions require it, Reclamation will conduct a NEPA require of those future actions

SLDMWA WWD SJRECWA 23: Reclamation was directed by the District Court to remedy its failure to conduct a NEPA analysis when it accepted and implemented the 2008 USFWS BO RPA and the 2009 NMFS BO RPA pursuant to the Federal Endangered Species Act of 1973 (ESA) as amended (United States Code [U.S.C.] 1531 et. seq.). In order to satisfy the Court's directive, Reclamation has analyzed operation of the CVP, in coordination with the operation of the SWP, consistent with the BOs, as well as alternatives which represent potential modifications to the continued long-term operation of the CVP in coordination with the SWP.

The No Action Alternative represents operations consistent with implementation of the 2008 and 2009 Biological Opinions. This No Action Alternative represents the current management direction and level of management intensity consistent with the explanation of the No Action Alternative included in Council of Environmental Quality's Forty Most Asked Questions (Question 3). NEPA does not require agencies to mitigate impacts, nor does it require agencies to identify mitigation associated with the No Action Alternative.

The purpose of the action, as described in Chapter 2, Purpose and Need, of the EIS, considers the purposes for which the CVP was authorized, and as amended by CVPIA, with a provision to enable Reclamation and DWR to satisfy their contractual obligations to the fullest extent possible, in accordance with the authorized purposes of the CVP and SWP, as well as the regulatory limitations on CVP and SWP operations, including applicable state and federal laws and water rights.

Reclamation has a legal obligation to comply with Section 7 of the ESA. Section 7 requires Reclamation to insure that actions it authorizes, funds or carries out do not jeopardize the continued existence of any listed species and do not destroy or

adversely modify designated critical habitat. This legal obligation was confirmed in the Central Valley Project Improvement Act. Most of Reclamation's contracts with CVP water users limit Reclamation's liability for shortages associated with meeting legal obligations of the CVP. Additionally, ESA prohibits unauthorized take of listed species. DWR has chosen to ensure its compliance with the ESA through coordinated operation of the SWP with the CVP and to implement the 2008 USFWS BO and 2009 NMFS BO.

Reclamation recognizes that some CVP water users either have initiated or are initiating programs to increase water supplies with separate environmental documentation (see Appendix 5D, Municipal and Industrial Water Demands and Supplies). Other CVP water users may implement future projects to increase water supplies, such as construction and operation of a desalination plants and water recycling programs. None of these future actions are currently authorized and are not being proposed by Reclamation as a part of this decision. Adoption of any of these types of these future actions, if authorized and funded by Reclamation, would require additional analysis under NEPA.

SLDMWA WWD SJRECWA 24: The need statement in Chapter 2 acknowledges that potential modifications to the coordinated operation of the CVP and SWP analyzed in the EIS process should be consistent with the intended purpose of the action, be within the scope of Reclamation's legal authority and jurisdiction, be economically and technologically feasible, and avoid the likelihood of jeopardizing listed species or resulting in the destruction or adverse modification of critical habitat in compliance with the requirements of Section 7(a)(2) of the Endangered Species Act.

SLDMWA WWD SJRECWA 25: The EIS analysis compares conditions under a range of alternatives (Alternatives 1 through 5) with the No Action Alternative to identify beneficial and adverse impacts for a broad range of physical, environmental, and human resources. A reasonable range of alternatives includes technically and economically feasible alternatives to address the purpose and need for the action (40 CFR 1502.14). However, the range of alternatives can be limited if the alternatives analyzed address the full spectrum of alternatives (Question 1b of CEQ Forty Most Asked Questions). The range of alternative concepts were evaluated with respect to screening criteria defined in the purpose of the action (see Chapter 2, Purpose and Need), a determination if the concept addressed one or more significant issues, and if the concept was included in one or more alternatives (Table 3.1 in Chapter 3, Description of Alternatives). The NEPA analysis does not determine if the alternatives would change the findings of the biological opinions in the determination of the likelihood of the alternatives to cause jeopardy to the continued existence of the species, or destroy or adversely affect their critical habitat.

SLDMWA WWD SJRECWA 26: The No Action Alternative and Alternative 5 consider actions from both of the 2008 USFWS BO and 2009 NMFS BO in an integrated manner. With respect to the potential conflict described in this comment, the EIS impact assessment of the No Action Alternative and Alternative 5 do indicate that reservoir releases to meet fall Delta outflow in wet

and above normal years would reduce carryover storage and potentially reduce the ability to meet temperature objectives downstream of the reservoirs. However, the No Action Alternative and Alternative 5 also include fish passage around CVP dams to provide upstream habitat with lower water temperatures.

SLDMWA WWD SJRECWA 27: The comparative tables in Chapter 3, Description of Alternatives, and Executive Summary have been modified in the Final EIS.

SLDMWA WWD SJRECWA 28: Given the complexity of the water system and associated aquatic ecosystem, tools are not available to reliably quantify the numbers of individuals of species, the viability of species populations, and the amount and quality of critical habitat. The analysis in the Draft EIS relied on modeling tools and qualitative analyses to provide an indication of these attributes for comparison among alternatives rather than attempting absolute quantification. However, numerical indications of potential changes in species abundance and habitat availability are presented throughout the impact analysis in the Draft EIS. For example, the two life cycle models used to evaluate effects on winter-run Chinook Salmon provide output in terms of expected escapement. Similarly, SALMOD and the Egg Mortality Model provide outputs that indicate potential changes in salmon abundance. Habitat quality was addressed in terms of water temperature and Weighted Useable Area (WUA) for salmonids and the fall abiotic index was used to quantify potential differences in Delta Smelt habitat.

The NEPA analysis does not determine if the alternatives would change the findings of the biological opinions in the determination of the likelihood of the alternatives to cause jeopardy to the continued existence of the species, or destroy or adversely affect their critical habitat.

SLDMWA WWD SJRECWA 29: The tables referenced in the comment represent a summary of the impact conclusions for each of the species evaluated. These conclusion statements, as pointed out in the comment, often indicate little distinction in the performance of an alternative relative to another. This is generally because the results of the quantitative analyses are sufficiently similar that a clear difference between the alternatives cannot be made or the uncertainty associated with the outcomes precludes a clear distinction among alternatives. The impact conclusions for each species in Chapter 9 and the summarized conclusions provided in table ES.1 and ES.2 have been revised to more definitely state the conclusions and provide decision makers and the public a clearer indication the magnitude of the differences. Also, please see response to Comment SLDMWA WWD SJRECWA 27.

SLDMWA WWD SJRECWA 30: The EIS analyzed the alternatives at 2030 to consider full implementation of the 2008 USFWS BO and 2009 NMFS BO at 2030; and full implementation of the provisions in each of the alternatives, such as completion of predation control plans in Alternatives 3 and 4 or fish passage programs in Alternative 5 and the No Action Alternative.

If the analyses were conducted at the present time, the existing conditions also would include implementation of the operational provisions of the 2008 USFWS

BO RPA and the 2009 NMFS BO RPA which had been provisionally accepted by Reclamation prior to the publication of the Notice of Intent in 2012.

SLDMWA WWD SJRECWA 31: More details have been included in Section 5.3.3 of Chapter 5, Surface Water Resources and Water Supplies, and Section 6.3.3.6 of Chapter 6, Surface Water Quality, in the Final EIS to describe historical responses by CVP and SWP to recent drought conditions and associated SWRCB requirements, including reductions in recent deliveries of CVP and SWP water. It is recognized that in the short-term, responses to reduced CVP and SWP water deliveries could be different than over the long-term. For example, during the recent drought some areas relied upon crop idling because expansion of groundwater wellfields was not easily implemented in the short-term. The EIS analysis is considering the long-term changes by 2030, including agricultural water supplies based upon long-term economic modeling (see results of SWAP model runs in Chapter 12, Agricultural Resources). The SWAP model indicated that even with the cost of groundwater pumping from greater depths, the overall agricultural production could be maintained.

The EIS includes the comparison of the No Action Alternative to the Second Basis of Comparison to indicate changes related to implementation of the 2008 USFWS BO and 2009 NMFS BO.

It is understood that in any one year with drought conditions, water users may make short-term choices that could involve more crop idling than increased use of groundwater. However, the analysis of groundwater use in Chapter 7, Groundwater Resources and Groundwater Quality, represent long-term operation assumptions that would occur by 2030. The agricultural analysis presented in Chapter 12, Agricultural Resources, indicated that economically, groundwater would continue to be used as compared to crop idling or land fallowing on a long-term basis by 2030.

SLDMWA WWD SJRECWA 32: In response to this and similar comments, additional discussion has been provided in the Final EIS to better capture recent scientific information and to further acknowledge the scientific uncertainty associated with the information used to both formulate the analyses and qualify the conclusions. This additional text is intended to supplement the discussions of uncertainty already presented in Chapter 9 of the Draft EIS and Appendices 9C through 9O. These additions can be found in the discussion of analysis methods and in the impact conclusions where appropriate.

SLDMWA WWD SJRECWA 33: Historically, many water users have been conjunctively use groundwater and surface water by increasing groundwater use when CVP and SWP water supplies are reduced. The urban water management plans present these types of programs for the 2030 conditions. As discussed in the response to Comment SLDMWA WWD SJRECWA 5, the SWAP model indicated that even with the cost of groundwater pumping from greater depths, the overall agricultural production could be maintained.

It should be noted that Figures 7.15 through 7.60 in Chapter 7, Groundwater Resources and Groundwater Quality, have been modified in the Final EIS to

correct an error that increased the changes in groundwater elevation by a factor of 3.25. This miscalculation was due to an error in a model post-processor that generates the figures related to changing the values from CVHM Model output from meters to feet. Therefore, the results in these figures and the related text in Chapter 7 are less than reported in the Draft EIS. The figures and the text have been revised in the Final EIS. No changes are required to the CVHM model. The revised results in the figures and the text in Chapter 7 are consistent with the findings of the SWAP model.

SLDMWA WWD SJRECWA 34: Groundwater Sustainability Agencies will respond differently in the development and implementation of each Groundwater Sustainability Plan (GSP). Different regions of California will have different levels of progress depending upon ongoing programs and facilities. Depending upon the GSP, full implementation of groundwater sustainable actions may not be possible until facilities are constructed to provide replacement water supplies for current groundwater use. Construction of those facilities, following review of the GSP by DWR, could require several years for environmental review, design, permitting, and construction. Therefore, it would be speculative to assume that the GSP objectives can be fully met prior to 2030 when the GSPs have not been completed; and the implementation actions may require a timeframe longer than 2030. It is acknowledged that following full implementation of the GSPs, continued long-term overdrafting of the groundwater would not be allowed.

SLDMWA WWD SJRECWA 35: Historically, many water users have been conjunctively using groundwater and surface water by increasing groundwater use when CVP and SWP water is reduced. The urban water management plans present these types of programs for the 2030 conditions. As discussed in the response to Comment SLDMWA WWD SJRECWA 5, the SWAP model indicated that even with the cost of groundwater pumping from greater depths, the overall agricultural production could be maintained.

It is recognized that in the short-term, responses to reduced CVP and SWP water deliveries could be different than over the long-term. For example, during the recent drought some areas relied upon crop idling because expansion of groundwater wellfields was not easily implemented in the short-term. The EIS analysis is considering the long-term changes by 2030, including agricultural water supplies based upon long-term economic modeling (see results of SWAP model runs in Chapter 12, Agricultural Resources). The SWAP model indicated that even with the cost of groundwater pumping from greater depths, the overall agricultural production could be maintained.

It should be noted that Figures 7.15 through 7.60 in Chapter 7, Groundwater Resources and Groundwater Quality, have been modified in the Final EIS to correct an error that increased the changes in groundwater elevation by a factor of 3.25 due to an error in a model post-processor that generates the figures related to changing the values from CVHM Model output from meters to feet. Therefore, the results in these figures and the related text in Chapter 7 are less than reported in the Draft EIS. The figures and the text have been revised in the Final EIS. No

1 changes are required to the CVHM model. The revised results in the figures and
2 the text in Chapter 7 are consistent with the findings of the SWAP model.

3 **SLDMWA WWD SJRECWA 36:** The comment is consistent with the analysis
4 related to subsidence in Section 7.4 of Chapter 7, Groundwater Resources and
5 Groundwater Quality, of the EIS.

6 **SLDMWA WWD SJRECWA 37:** Please refer to responses to Comments
7 SLDMWA WWD SJRECWA 5 and SLDMWA WWD SJRECWA 33.

8 **SLDMWA WWD SJRECWA 38:** Please refer to responses to Comments
9 SLDMWA WWD SJRECWA 5, SLDMWA WWD 31, and SLDMWA WWD
10 SJRECWA 35.

11 **SLDMWA WWD SJRECWA 39:** As described in responses to Comments
12 SLDMWA WWD SJRECWA 5 and SLDMWA WWD SJRECWA 33, the SWAP
13 analysis indicates that long-term regional agricultural land use, production, and
14 employment would be similar in the alternatives and the Second Basis of
15 Comparison. Therefore, socioeconomic conditions in the agricultural
16 communities would be similar in 2030 within the range of alternatives.

17 It is recognized that in the short-term, responses to reduced CVP and SWP water
18 deliveries could be different than over the long-term. For example, during the
19 recent drought some areas relied upon crop idling because expansion of
20 groundwater wellfields was not easily implemented in the short-term. This led to
21 job losses. The EIS analysis is considering the long-term changes by 2030,
22 including changes in agricultural water supplies based upon long-term economic
23 modeling (see results of SWAP model runs in Chapter 12, Agricultural
24 Resources). The SWAP model indicated that even with the cost of groundwater
25 pumping from greater depths, the overall agricultural production could be
26 maintained.

27 **SLDMWA WWD SJRECWA 40:** As described in responses to Comments
28 SLDMWA WWD SJRECWA 5 and SLDMWA WWD SJRECWA 33, the SWAP
29 analysis indicates that long-term regional agricultural land use, production, and
30 employment would be similar in the alternatives and the Second Basis of
31 Comparison. Therefore, environmental justice conditions in the agricultural
32 communities would be similar in 2030 within the range of alternatives.

33 It is recognized that in the short-term, responses to reduced CVP and SWP water
34 deliveries could be different than over the long-term. For example, during the
35 recent drought some areas relied upon crop idling because expansion of
36 groundwater wellfields was not easily implemented in the short-term. This led to
37 job losses. The EIS analysis is considering the long-term changes by 2030,
38 including changes in agricultural water supplies based upon long-term economic
39 modeling (see results of SWAP model runs in Chapter 12, Agricultural
40 Resources). The SWAP model indicated that even with the cost of groundwater
41 pumping from greater depths, the overall agricultural production could be
42 maintained.

SLDMWA WWD SJRECWA 41: As described in responses to Comments SLDMWA WWD SJRECWA 5 and SLDMWA WWD SJRECWA 35, the SWAP analysis indicates that long-term regional agricultural land use, production, and employment would be similar in the alternatives and the Second Basis of Comparison. Therefore, air quality conditions in the agricultural communities would be similar.

SLDMWA WWD SJRECWA 42: The CVP and SWP operations prioritize meeting federal and state regulatory requirements and deliveries to senior water rights holders and refuge Level 2 water supplies. The modeling analyses presented in the EIS include these prioritizations for long-term operation of the CVP and SWP using an 82-year hydrology analyzed with the CalSim II model, including delivery of Level 2 refuge water supplies in accordance with the CVPIA. This analytical approach results in low water storage elevations in CVP and SWP reservoirs and low deliveries to CVP agricultural water service contractors located to the south of the Delta in critical dry periods. The modeled operations do not include changes in SWRCB requirements intended to reduce the effects of extreme flood or drought events, such as the recent changes in CVP and SWP drought operations.

Droughts have occurred throughout California's history, and are constantly shaping and innovating the ways in which Reclamation and DWR balance both public health standards and urban and agricultural water demands while protecting the Delta ecosystem and its inhabitants. The most notable droughts in recent history are the droughts that occurred in 1976-77, 1987-92, and the ongoing drought. More details have been included in Section 5.3.3 of Chapter 5, Surface Water Resources and Water Supplies, and Section 6.3.3.6 of Chapter 6, Surface Water Quality, in the Final EIS to describe historical responses by CVP and SWP to these drought conditions, including reductions in recent deliveries of CVP water to the refuges and water service contractors.

SLDMWA WWD SJRECWA 43: The EIS analysis of groundwater effects in the San Francisco Bay Area, Central Coast, and Southern California regions is difficult for two reasons. The CalSim II model water deliveries to these regions are provided at a large regional scale, and it is not possible to determine the deliveries by groundwater basin. In addition, there are no available consistent regional groundwater models that could be used for the CVP and SWP service areas in the San Francisco Bay Area, Central Coast, and Southern California regions. Therefore, a qualitative analysis was conducted in the EIS for changes in groundwater conditions and quality and related subsidence.

Additional description of the qualitative methodology used in these areas has been added to Section 7.4 of Chapter 7, Groundwater Resources and Groundwater Quality. CVP and SWP water delivery information that is currently provided in Appendix 5A, Section C, CalSim II and DSM2 Model Results, has also been added to Chapter 7.

SLDMWA WWD SJRECWA 44: The alternatives and the Second Basis of Comparison are all compared with the same future climate and growth projections

1 at 2030. The environmental analysis does not compare the future conditions
2 under the alternatives and Second Basis of Comparison to existing conditions.

3 The commenter's "Interpretation B" is correct. The explanation of the
4 methodology is included Appendix 7A, Groundwater Model Documentation.

5 **SLDMWA WWD SJRECWA 45:** Additional information has been included in
6 Section 7.4.2 of Chapter 7, Groundwater Resources and Groundwater Quality, to
7 qualitatively discuss groundwater changes between existing conditions and 2030
8 conditions. As described in the response to Comment SLDMWA WWD
9 SJRECWA 44, the EIS analysis involves comparison of the No Action
10 Alternative, Second Basis of Comparison, and Alternatives 1 through 5 at Year
11 2030.

12 **SLDMWA WWD SJRECWA 46:** The text on page 7-112 of the Draft EIS has
13 been modified in the Final EIS to provide more clarity of the use of qualitative
14 analyses for potential changes in subsidence.

15 **SLDMWA WWD SJRECWA 47:** There are no acceptable regional groundwater
16 models available; therefore, the analysis was qualitative. Additional text in the
17 Final EIS has been added to the impact analysis that provides additional
18 groundwater quality information.

19 **SLDMWA WWD SJRECWA 48:** The CalSim II post-processor tool was
20 developed in the initial phase of the EIS preparation. Results for flows in
21 Steamboat Slough were included to determine if there was any changes in the
22 North Delta conditions under the alternatives. Millerton Lake results were
23 included to indicate that there were no changes in the operations of the CVP
24 Friant Division for the coordinated long-term operation of the CVP and SWP.

25 **SLDMWA WWD SJRECWA 49:** More details have been included in Section
26 9.4.3 of Chapter 9, Fish and Aquatic Resources, in the Final EIS to qualitatively
27 responses to RPA actions not included in the CalSim II model in the No Action
28 Alternative and Alternatives 2 and 5.

29 **SLDMWA WWD SJRECWA 50:** The additional water demand in the
30 Sacramento Valley has been identified in approved general plans and is included
31 in the adopted urban water management plans of these communities. The
32 increased demand are projected to be met through existing water rights in El
33 Dorado, Nevada, Placer, and Sacramento counties and full use of CVP water
34 contracts in Sacramento County. The water rights are senior to water rights held
35 by the CVP and SWP and would need to be fulfilled in the future. Therefore, the
36 additional water demands are included in the No Action Alternative, Second Basis
37 of Comparison, and Alternatives 1 through 5.

38 **SLDMWA WWD SJRECWA 51:** The CVP and SWP operations prioritize
39 meeting federal and state regulatory requirements and deliveries to senior water
40 rights holders. The modeling analyses presented in the EIS include these
41 prioritizations for long-term operation of the CVP and SWP without inclusion of
42 changes that could be developed for specific extreme flood or drought events.

1 Water is delivered every year under the water rights in the 82-year hydrology
2 analyzed with the CalSim II model in the EIS.

3 As described in Section 5.4.1.1.1 of Chapter 5, Surface Water Resources and
4 Water Supplies, under extreme hydrologic and operational conditions where there is
5 not enough water supply to meet all requirements, CalSim II utilizes a series of
6 operating rules to reach a solution to allow for the continuation of the simulation. It
7 is recognized that these operating rules are a simplified version of the very complex
8 decision processes that CVP and SWP operators would use in actual extreme
9 conditions. Therefore, model results and potential changes under these extreme
10 conditions should be evaluated on a comparative basis between alternatives and are
11 an approximation of extreme operational conditions. As an example, CalSim II
12 model results show simulated occurrences of extremely low storage conditions at
13 CVP and SWP reservoirs during critical drought periods when storage is at dead pool
14 levels at or below the elevation of the lowest level outlet. Simulated occurrences of
15 reservoir storage conditions at dead pool levels may occur coincidentally with
16 simulated impacts that are determined to be potentially significant. When reservoir
17 storage is at dead pool levels, there may be instances in which flow conditions fall
18 short of minimum flow criteria, salinity conditions may exceed salinity standards,
19 diversion conditions fall short of allocated diversion amounts, and operating
20 agreements are not met.

21 Reclamation is aware of the storage and diversion limitations that exist for the
22 reservoirs, including the intakes in Folsom Lake, during drought periods when
23 Reclamation may be allocating and delivering water in consideration of federal
24 and state regulatory requirements, including water rights. Droughts have occurred
25 throughout California's history, and are constantly shaping and innovating the
26 ways in which Reclamation and DWR balance both federal and state regulations,
27 public health standards and urban and agricultural water demands. The most
28 notable droughts in recent history are the droughts that occurred in 1976-77,
29 1987-92, and the ongoing drought. More details have been included in
30 Section 5.3.3 of Chapter 5, Surface Water Resources and Water Supplies, in the
31 Final EIS to describe historical responses by CVP and SWP to these drought
32 conditions.

33 **SLDMWA WWD SJRECWA 52:** The EIS includes the comparison of
34 Alternatives 1 through 5 to the No Action Alternative enabling decision makers to
35 compare the magnitude of environmental effects of the alternatives as compared
36 to the No Action Alternative benchmark (in accordance with Question 3 of the
37 CEQ Forty Most Asked Questions). The EIS analysis does not include a
38 determination of significance thresholds or comparison of the results of impact
39 assessment to the significance thresholds.

40 The EIS impact analysis starts with use of the monthly CalSim II model to project
41 CVP and SWP water deliveries. Because this regional model uses monthly time
42 steps to simulate requirements that change weekly or change through
43 observations, it was determined that changes in the model of 5 percent or less
44 were related to the uncertainties in the model processing. Therefore, reductions of
45 5 percent or less in this comparative analysis are considered to be not

substantially different, or “similar.” This approach is similar to that used in the Shasta Lake Resources Investigation EIS published by Reclamation in 2015.

SLDMWA WWD SJRECWA 53: The No Action Alternative, Second Basis of Comparison, and Alternatives 1 through 5 include consistent climate change and sea level rise conditions. The EIS assumes that there will be no changes in regulatory or operational requirements due to climate change in the future. The EIS analyzes the alternatives in a comparative manner, and does not analyze any of the alternatives individually. Therefore, the impact analysis compares conditions under the Alternatives 1 through 5 to the No Action Alternative; and conditions under the No Action Alternative and Alternatives 1 through 5 to the Second Basis of Comparison. This comparative approach eliminates effects of climate change and sea level rise and indicates the differences in the comparisons of alternatives to the No Action Alternative and Second Basis of Comparison.

The alternatives and the Second Basis of Comparison are all compared with the same future climate and growth projections at 2030. The EIS analyzed the alternatives at 2030 because the current BOs were analyzed for conditions until 2030. Also, by 2030, there would be full implementation of the provisions in each of the alternatives, such as completion of predation control plans in Alternatives 3 and 4 or fish passage programs in Alternative 5 and the No Action Alternative. If the environmental analysis was conducted under CEQA by a California-based public agency, the analysis would include a comparison of future conditions to existing conditions.

Additional text in Section 5A.A.5.3.1 has been included to discuss that selection of the climate change scenario (Q1 to Q5) does not affect the results of the comparison of alternatives to the No Action Alternative or Second Basis of Comparison. The climate change assumptions are major factors in the determination of reservoir storage and available water for CVP and SWP deliveries in the alternatives. However, the effects of climate change occur under both sets of operational scenarios in the comparative analysis. Therefore, the incremental differences between the alternatives, the No Action Alternative, and the Second Basis of Comparison are similar no matter which climate change scenario is selected, although the absolute results are different. The NEPA analysis is based upon the incremental difference, and not necessarily upon the absolute values of the model results. In addition, due to the uncertainties in the use of planning models (e.g., CalSim II, CVHM, SWAP, CWEST), the results should always be used in a comparative manner and not for prediction of absolute values.

SLDMWA WWD SJRECWA 54: The CalSim II model results presented in Appendix 5A, Section C, CalSim II and DSM2 Model Results, Figures 19.1.1 through 19.1.9 are correct. Tables 19.1.1 through 19.6.2 have been corrected and footnotes have been added to explain how water deliveries to San Francisco Bay Area CVP water users are allocated to the areas North of Delta and South of Delta in the second portions of each table.

1 **SLDMWA WWD SJRECWA 55:** In response to this and similar comments
2 made by others, text has been added to the Affected Environment section of the
3 Final EIS to appropriately provide attribution where needed and to expand the
4 discussion and reference to information in the recent scientific literature. For
5 example, the text on page 9-57 of the Draft EIS has been modified to clarify the
6 timing of spring-run emigration in the Delta and appropriately cite the sources of
7 information, including Snider and Titus (1998, 2000b, c, d), Vincik et al. (2006),
8 and Roberts (2007). These same changes have been applied to the discussion of
9 spring-run Chinook Salmon in other parts of the document and in Appendix 9B
10 for consistency.

11 The text on invasive species on page 9-80 of the Draft EIS has been modified to
12 better define invasive species. The term “invasive species” is now defined (in a
13 footnote) as “species that establish and reproduce rapidly outside of their native
14 range and may threaten the diversity or abundance of native species through
15 competition for resources, predation, parasitism, hybridization with native
16 populations, introduction of pathogens, or physical or chemical alteration of the
17 invaded habitat.” This is consistent with the commenter’s description of the harm
18 that invasive species can have on the environment.

19 The text on predation on page 9-97 of the Draft EIS has been modified to remove
20 the uncited NMFS reference and add more recent information on predation in the
21 Tuolumne River with the appropriate citations. In addition, text was inserted to
22 better clarify the current understanding of the relation (and uncertainty) between
23 X2 and Delta Smelt habitat and water quality in the Stockton Deepwater Ship
24 Channel. Additional text has been added on page 9-56 from the most recent POD
25 report (Baxter et al. 2010) regarding the potential drivers of the POD and
26 clarifying the relationship (and uncertainty in the relationship) between X2 and
27 habitat for these species.

28 **SLDMWA WWD SJRECWA 56:** Please see responses in Section 1.D.1.14,
29 State Water Contractors, for responses to comments from the State Water
30 Contractors.

31 **SLDMWA WWD SJRECWA 57:** As discussed in response to Comments
32 SLDMWA WWD SJRECWA 13, the analysis in the EIS compares conditions
33 under Alternatives 1 through 5 with the No Action Alternative to identify
34 beneficial and adverse impacts for a broad range of physical, environmental, and
35 human resources. The NEPA analysis does not determine if the alternatives
36 would change the findings of the biological opinions in the determination of the
37 likelihood of the alternatives to cause jeopardy to the continued existence of the
38 species, or destroy or adversely affect their critical habitat. Also, please see the
39 response to SLDMWA WWD SJRECWA 28, which explains the basis of the
40 analysis and text additions in the Final EIS to more sharply define the differences
41 among alternatives.

42 **SLDMWA WWD SJRECWA 58:** Section 9.4.1.3.3 does state that “[c]hanges
43 in CVP and SWP operations can affect through-Delta survival of migratory (e.g.,
44 salmonids) and resident (e.g., Delta and Longfin smelt) fish species through

changes in the level of entrainment at CVP and SWP export pumping facilities” as indicated in the comment, but this statement is not conclusory and does not need a citation. It is well known that changes in operations can affect entrainment in the facilities, and therefore survival. Nowhere in this section does the DEIS assert that “exports are negatively related to through-Delta survival” or conclude that “that entrainment is related to abundance.”

The conclusion on page 9-150 that “[i]t is not likely that operations of the CVP and SWP under the Second Basis of Comparison would result in improvement of habitat conditions in the Delta or increases in populations for these fish by 2030, and the recent trajectory of loss would likely continue” refers specifically to “operations” not habitat restoration. The basis for this conclusion is presented in the preceding paragraphs on that page. For example, lines 18-22 state “[u]nder the Second Basis of Comparison in 2030, many years will have passed without seasonal limitations on OMR reverse (negative) flow rates, with the anticipated result that fish entrainment would occur at levels comparable to recent historical conditions. Future pumping operations would continue to expose fish to the salvage facilities and entrainment losses into the future.”

SLDMWA WWD SJRECWA 59: The EIS includes the comparison of Alternatives 1 through 5 to the No Action Alternative enabling decision makers to compare the magnitude of environmental effects of the alternatives as compared to the No Action Alternative benchmark (in accordance with Question 3 of the CEQ Forty Most Asked Questions). The EIS analysis does not include a determination of significance thresholds or comparison of the results of impact assessment to the significance thresholds.

Given the complexity of the water system and associated aquatic ecosystem, tools are not available to reliably quantify the numbers of individuals of species, the viability of species populations, and the amount and quality of critical habitat. The analysis in the Draft EIS relied on modeling tools and qualitative analyses to provide indication of these attributes for comparison among alternatives rather than attempting absolute quantification. However, numerical indications of potential changes in species abundance and habitat availability are presented throughout the impact analysis in the Draft EIS. For example, the two life cycle models used to evaluate effects on winter-run Chinook Salmon provide output in terms of expected escapement. Similarly, SALMOD and the Egg Mortality Model provide outputs that indicate potential changes in salmon abundance. Habitat quality was addressed in terms of water temperature and WUA for salmonids and the fall abiotic index was used to quantify potential differences in Delta Smelt habitat. This information contributes to the subsequent effects analysis under Section 7 of the ESA, but as discussed in response to Comment SLDMWA WWD SJRECWA 25, the NEPA analysis does not address species viability or determine if the alternatives would be likely to cause jeopardy to the continued existence of the species, or destroy or adversely affect their critical habitat.

SLDMWA WWD SJRECWA 60: The analysis of spring-run Chinook Salmon referenced in the comment was based on the results of a combination of

quantitative and qualitative assessments (see Section 9.4.1.8), and was intended to provide indication of the relative differences between the No Action Alternative and the Second Basis of Comparison. In this example, the descriptive term “slightly more adverse” was used to indicate the relative magnitude of the difference. This term was not intended to imply significance (as in CEQA) or the likelihood of jeopardy, which would commonly be found in an ESA analysis, not NEPA. This and other descriptive terms were used in the Draft EIS for presenting the results of the analyses for other species.

The EIS includes the comparison of Alternatives 1 through 5 to the No Action Alternative enabling decision makers to compare the magnitude of environmental effects of the alternatives as compared to the No Action Alternative benchmark (in accordance with Question 3 of the CEQ Forty Most Asked Questions). The EIS analysis does not include a determination of significance thresholds or comparison of the results of impact assessment to the significance thresholds.

SLDMWA WWD SJRECWA 61: While Chapter 9 acknowledges the existence of other stressors for listed species, it also acknowledges that it is impossible to scale the effects of these stressors relative to CVP/SWP operations or determine with any certainty the population level effects of any action. Regarding the scale of flow variations resulting from such operational modifications versus natural flow variations due to the Bay-Delta tidal system, the Bay-Delta system is hardly natural and the flow variations due to the tidal system would be present under any of the alternatives.

The NMFS (2014) attachment showing the relative significance of entrainment versus harvest, predation, and other stressors is based entirely on subjective weightings based on the importance of each life stage, stressor category, and individual stressors. NMFS makes no distinction between stressors in each of the overall stressor category other than sorting by “Normalized Weight” of individual stressors. It should be noted that the “Jones and Banks Pumping Plants” individual stressor is still rated as “VH” (Very High) as an overall stressor and is the highest rated stressor in the “Entrainment” stressor category.

The literature sources provided in footnote 10 do not conclude “that more flow is not necessarily the solution in highly altered systems” as indicated in the comment. Hart and Finelli (1999) indicate that flow is the primary environmental factor determining the character of aquatic ecosystems, a notion shared by the other authors. Most of these authors argue for a more natural flow regime in altered systems or preservation of the natural flow regime if it exists. Poff et al. (1997) recognized that full flow restoration is not always possible and argue for capitalizing on the natural between-year variability in flow and mimicking certain geomorphic processes may provide some ecological benefits. This supports the assertion in the comment that efficient or targeted use of flow is more likely to attain specific ecological benefits, particularly when paired with additional actions to address non-flow stressors. However, the targeted use of flow is not included in the range of alternatives evaluated and is beyond the scope of this NEPA analysis. In addition, the effectiveness of this approach is uncertain. Bunn and Arthington (2002) point out that there is limited ability to predict and quantify

1 biotic responses to flow regulation or separate impacts of altered flow regimes
2 from other factors and interactions. Poff and Zimmerman (2010) conducted a
3 substantial literature review and found that the literature “support[s] the inference
4 that flow alteration is associated with ecological change and that the risk of
5 ecological change increases with increasing magnitude of flow alteration.”

6 **SLDMWA WWD SJRECWA 62:** The life cycle models of Maunder and Deriso
7 (2011) were referenced on page 9-115 and in Appendix 9B of the Draft EIS. The
8 Maunder and Deriso model uses survey data from the 20mm trawl, summer tow
9 net, and FMWT time series to explore the possibility of density dependence
10 between life stages and possible environmental covariates by fitting the model to
11 the existing data. It was not used because it was not designed (or used) for
12 forecasting future Delta smelt population abundance. The life cycle model
13 developed by Rose et al. (2013a, b) could not be used in this analysis because it
14 uses a wide array of daily data, many of the assumptions and parameter values
15 were based on judgment, and the model was “designed for exploring hypotheses
16 about some of the factors affecting Delta Smelt population dynamics but is not
17 designed for forecasting future Delta Smelt population abundances.” In addition,
18 Reed et al. (2014) noted that “To date, these models have not been fully vetted
19 and evaluated sufficiently to be used for direct management applications.”

20 **SLDMWA WWD SJRECWA 63:** Reclamation has modified the Final EIS in
21 response to comments from SLDMWA WWD SJRECWA and other commenters;
22 and will use the Final EIS in the development of the Record of Decision.

23 **SLDMWA WWD SJRECWA 64:** Comment noted.

24 **SLDMWA WWD SJRECWA 65:** Please see responses to Comments
25 SLDMWA WWD SJRECWA 72 to SLDMWA WWD SJRECWA 147.

26 **SLDMWA WWD SJRECWA 66:** Comment noted.

27 **SLDMWA WWD SJRECWA 67:** At the time the request for extension of the
28 review period for the Administrative Draft EIS by Cooperating Agencies was
29 submitted, the Amended Judgement dated September 30, 2014 issued by the
30 United States District Court for the Eastern District of California (District Court)
31 in the *Consolidated Delta Smelt Cases* required Reclamation to issue a Record of
32 Decision by no later than December 1, 2015. Due to this requirement,
33 Reclamation did not have sufficient time to extend the review period. On October
34 9, 2015, the District Court granted a very short time extension to address
35 comments received during the public review period, and requires Reclamation to
36 issue a Record of Decision on or before January 12, 2016. This current court
37 ordered schedule does not provide sufficient time for Reclamation to extend the
38 public review period.

39 **SLDMWA WWD SJRECWA 68:** Please see response to Comment SLDMWA
40 WWD SJRECWA 4.

41 **SLDMWA WWD SJRECWA 69:** A table has been added to Chapter 3,
42 Description of Alternatives, to simply compare the long-term effects of
43 implementing Alternatives 1 through 5 to the No Action Alternative. The

1 comparison is presented in accordance with NEPA requirements (40 CFR
2 1502.16); and, therefore, does not include the comparison of alternatives to the
3 Second Basis of Comparison.

4 **SLDMWA WWD SJRECWA 70:** The impacts and impact conclusions in
5 Chapter 9 have been revised to more definitely state the conclusions and provide
6 decision makers and the public a clearer indication of the magnitude and
7 materiality of the differences where a distinction among alternatives exists. In
8 addition, text has been inserted into the Final EIS to better reflect uncertainty and
9 information in the recent scientific literature, including the discussion of OMR.
10 Also, please see response to Comment SLDMWA WWD SJRECWA 32.

11 **SLDMWA WWD SJRECWA 71:** Reclamation has modified the Final EIS in
12 response to comments from SLDMWA WWD SJRECWA and other commenters;
13 and will use the Final EIS in the development of the Record of Decision.

14 **SLDMWA WWD SJRECWA 72:** Comment noted.

15 **SLDMWA WWD SJRECWA 73:** The Administrative Draft EIS reviewed by
16 Cooperating Agencies in April 2013 was substantially modified prior to
17 publication of the Draft EIS in July 2015.

18 **SLDMWA WWD SJ RECWA 74:** The Ninth Circuit upheld the validity of both
19 BOs and FWS and NMFS are no longer under court order to complete new BOs
20 on the effects of CVP and SWP operations on listed species. The remand order to
21 Reclamation does not trigger any obligation for a new Biological Assessment
22 unless Reclamation decides to operate the CVP differently from the operations
23 described in the BOs.

24 Because Reclamation identified the No Action Alternative as the Preferred
25 Alternative and the No Action Alternative is consistent with the operation
26 described in the BOs, Reclamation does not need to prepare a Biological
27 Assessment at this time. If Reclamation chooses to alter the operation from that
28 described in the BOs at some future time and the effects of the operations are not
29 covered in the analysis of the BOs, a Biological Assessment would be prepared to
30 initiate the Section 7 consultation process.

31 **SLDMWA WWD SJRECWA 75:** Please see response to Comment SLDMWA
32 WWD SJRECWA 4.

33 **SLDMWA WWD SJRECWA 76:** Please see response to Comment SLDMWA
34 WWD SJRECWA 3.

35 **SLDMWA WWD SJRECWA 77:** Please see response to Comments SLDMWA
36 WWD SJRECWA 32 and SLDMWA WWD SJRECWA 62.

37 **SLDMWA WWD SJRECWA 78:** The EIS analysis includes quantitative
38 analyses.

39 **SLDMWA WWD SJRECWA 79:** Please see response to Comment SLDMWA
40 WWD SJRECWA 74.

1 **SLDMWA WWD SJRECWA 80:** The responses to the comments in Exhibit B
2 are presented in this appendix as response to Comments SLDMWA WWD
3 SJRECWA 84 to SLDMWA WWD SJRECWA 101.

4 **SLDMWA WWD SJRECWA 81:** Please see responses to Comments
5 SLDMWA WWD SJRECWA 102 to SLDMWA WWD SJRECWA 147.

6 **SLDMWA WWD SJRECWA 82:** Comment noted.

7 **SLDMWA WWD SJRECWA 83:** Comment noted.

8 **SLDMWA WWD SJRECWA 84:** Please see response to Comment SLDMWA
9 WWD SJRECWA 3.

10 **SLDMWA WWD SJRECWA 85:** Please see response to Comment SLDMWA
11 WWD SJRECWA 25.

12 **SLDMWA WWD SJRECWA 86:** Please see response to Comment SLDMWA
13 WWD SJRECWA 74.

14 **SLDMWA WWD SJRECWA 87:** As described in the response to Comment
15 SLDMWA WWD SJRECWA 74, the BOs were upheld. The Ninth Circuit
16 upheld the validity of both BOs and FWS and NMFS are no longer under court
17 order to complete new BOs on the effects of CVP and SWP operations on listed
18 species. The remand order to Reclamation does not trigger any obligation for new
19 BOs from FWS and NMFS unless Reclamation decides to operate the CVP
20 differently from the operations described in the BOs. As described in the
21 response to Comment SLDMWA WWD SJRECWA 3, the EIS provides a
22 comparison of projected adverse effects and benefits of Alternatives 1 through 5
23 and the No Action Alternative. The EIS also provides a comparison of conditions
24 of the No Action Alternative and Alternatives 1 through 5 and the Second Basis
25 of Comparison. The NEPA analysis does not determine if the alternatives would
26 change the findings of the biological opinions in the determination of the
27 likelihood of the alternatives to cause jeopardy to the continued existence of the
28 species, or destroy or adversely affect their critical habitat.

29 **SLDMWA WWD SJRECWA 88:** As described in the comment, the EIS
30 analyzes the effects of coordinated long-term operation of the CVP and SWP on
31 both Delta Smelt, salmonid species, and sturgeon species.

32 **SLDMWA WWD SJRECWA 89:** Please see response to Comment SLDMWA
33 WWD SJRECWA 14 and SLDMWA WWD SJRECWA 74

34 **SLDMWA WWD SJRECWA 90:** The purpose of the action was modified in the
35 EIS following preparation of the 2013 Administrative Draft EIS for Cooperating
36 Agency review to include consistency with Federal Reclamation law; other
37 Federal laws and regulations; Federal permits and licenses; and State of California
38 water rights, permits, and licenses. Reclamation has a legal obligation to comply
39 with these law, permits, and licenses, including with Section 7 of the ESA.

40 **SLDMWA WWD SJRECWA 91:** As described in the response to Comment
41 SLDMWA WWD SJRECWA 74, the BOs were upheld by the Court. Please see

- 1 response to Comment SLDMWA WWD SJRECWA 24 related to the Need
- 2 statement in Chapter 2, Purpose and Need, of the EIS.
- 3 **SLDMWA WWD SJRECWA 92:** Please see response to Comments SLDMWA
- 4 WWD SJRECWA 4.
- 5 **SLDMWA WWD SJRECWA 93:** Please see response to Comment SLDMWA
- 6 WWD SJRECWA 4.
- 7 **SLDMWA WWD SJRECWA 94:** Please see response to Comment SLDMWA
- 8 WWD SJRECWA 16.
- 9 **SLDMWA WWD SJRECWA 95:** The discussion of development and
- 10 application of the screening criteria, and subsequent identification of alternatives
- 11 has been expanded in the EIS as compared to the discussion included in the 2013
- 12 Administrative Draft EIS for Cooperating Agency review.
- 13 **SLDMWA WWD SJRECWA 96:** The EIS analysis compares conditions under
- 14 a range of alternatives (Alternatives 1 through 5) with the No Action Alternative
- 15 to identify beneficial and adverse impacts for a broad range of physical,
- 16 environmental, and human resources. A reasonable range of alternatives includes
- 17 technically and economically feasible alternatives to address the purpose and need
- 18 for the action (40 CFR 1502.14). However, the range of alternatives can be
- 19 limited if the alternatives analyzed address the full spectrum of alternatives
- 20 (Question 1b of CEQ Forty Most Asked Questions). The range of alternative
- 21 concepts was evaluated with respect to screening criteria defined in the purpose of
- 22 the action (see Chapter 2, Purpose and Need), a determination if the concept
- 23 addressed one or more significant issues, and if the concept was included in one
- 24 or more alternatives (Table 3.1 in Chapter 3, Description of Alternatives). The
- 25 NEPA analysis does not determine if the alternatives would change the findings
- 26 of the biological opinions in the determination of the likelihood of the alternatives
- 27 to cause jeopardy to the continued existence of the species, or destroy or
- 28 adversely affect their critical habitat.
- 29 **SLDMWA WWD SJRECWA 97:** The EIS analysis includes quantitative
- 30 analyses.
- 31 **SLDMWA WWD SJRECWA 98:** In response to this and similar comments, text
- 32 was added to the Final EIS to better clarify uncertainty, particularly as it relates to
- 33 recent information in the scientific literature. These modifications to the text
- 34 were made in the Affected Environment sections where relationships between
- 35 physical attributes of the system and species responses are discussed as well as in
- 36 the impact conclusions where it was necessary to qualify a conclusion based on
- 37 the level of uncertainty or to describe expert disagreement.
- 38 **SLDMWA WWD SJRECWA 99:** The EIS analysis includes quantitative
- 39 analyses using a wide range of analytical tools, including those listed in this
- 40 comment.
- 41 **SLDMWA WWD SJRECWA 100:** This comment addressed the 2013
- 42 Administrative Draft EIS prepared for Cooperating Agency review. That version
- 43 of the EIS did not include quantitative analyses. The Draft EIS and Final EIS

1 include quantitative analyses where appropriate models are available; and the
2 numeric results are considered in conjunction with the remaining qualitative
3 analyses in the comparison of alternatives. Also, please see response to Comment
4 SLDMWA WWD SJRECWA 59.

5 **SLDMWA WWD SJRECWA 101:** Please see response to Comments
6 SLDMWA WWD SJRECWA 102 and SLDMWA WWD SJRECWA 147.

7 **SLDMWA WWD SJRECWA 102:** Comment noted.

8 **SLDMWA WWD SJRECWA 103:** The Ninth Circuit upheld the validity of
9 both BOs and FWS and NMFS are no longer under court order to complete new
10 BOs on the effects of CVP and SWP operations on listed species. The remand
11 order to Reclamation does not trigger any obligation for a new Biological
12 Assessment unless Reclamation decides to operate the CVP differently from the
13 operations described in the BOs.

14 Because Reclamation identified the No Action Alternative as the Preferred
15 Alternative and the No Action Alternative is consistent with the operation
16 described in the BOs, Reclamation does not need to prepare a Biological
17 Assessment at this time. If Reclamation chooses to alter the operation from that
18 described in the BOs at some future time and the effects of the operations are not
19 covered in the analysis of the BOs, a Biological Assessment would be prepared to
20 initiate the Section 7 consultation process.

21 **SLDMWA WWD SJRECWA 104:** Comment noted.

22 **SLDMWA WWD SJRECWA 105:** As described in Section 23.4 of Chapter 23,
23 Consultation and Coordination, of the EIS, a Memorandum of Understanding was
24 developed and signed by the Cooperating Agencies listed in the EIS.

25 **SLDMWA WWD SJRECWA 106:** The Ninth Circuit upheld the validity of
26 both BOs and FWS and NMFS are no longer under court order to complete new
27 BOs on the effects of CVP and SWP operations on listed species. The remand
28 order to Reclamation does not trigger any obligation for a new Biological
29 Assessment unless Reclamation decides to operate the CVP differently from the
30 operations described in the BOs and the effects of the operations are not covered
31 in the analysis of the BOs.

32 Because Reclamation identified the No Action Alternative as the Preferred
33 Alternative and the No Action Alternative is consistent with the operation
34 described in the BOs, Reclamation does not need to prepare a Biological
35 Assessment at this time. If Reclamation chooses to alter the operation from that
36 described in the BOs at some future time and the effects of the operations are not
37 covered in the analysis of the BOs, a Biological Assessment would be prepared to
38 initiate the Section 7 consultation process.

39 **SLDMWA WWD SJRECWA 107:** NEPA suggests an EIS be prepared for
40 broad and major federal actions, the alternatives could have significant adverse
41 effects, and/or there is a high degree of controversy (40 CFR 1501.4, 1502.4,
42 1508.18; and Question 37b of CEQ Forty Most Asked Questions). Based upon
43 these considerations, the range of alternatives suggested during the scoping

process, as described in Chapter 3, Description of Alternatives, and the need to quantitatively evaluate a wide range of potential changes to the environment due to implementation of the alternatives, Reclamation determined that the appropriate NEPA document should be an EIS.

The Ninth Circuit upheld the validity of both BOs and FWS and NMFS are no longer under court order to complete new BOs on the effects of CVP and SWP operations on listed species. The remand order to Reclamation does not trigger any obligation for new BOs from FWS and NMFS unless Reclamation decides to operate the CVP differently from the operations described in the BOs. The EIS provides a comparison of projected adverse effects and benefits of Alternatives 1 through 5 and the No Action Alternative. The EIS also provides a comparison of conditions of the No Action Alternative and Alternatives 1 through 5 and the Second Basis of Comparison. The NEPA analysis does not determine if the alternatives would change the findings of the biological opinions in the determination of the likelihood of the alternatives to cause jeopardy to the continued existence of the species, or destroy or adversely affect their critical habitat.

SLDMWA WWD SJRECWA 108: Comment noted.

SLDMWA WWD SJRECWA 109: The purpose of the action and the need for the action were modified in the EIS following preparation of the Notice of Intent to include consistency with Federal Reclamation law; other Federal laws and regulations; Federal permits and licenses; and State of California water rights, permits, and licenses. Reclamation has a legal obligation to comply with these law, permits, and licenses, including with Section 7 of the ESA.

SLDMWA WWD SJRECWA 110: The Affected Environment sections of the EIS include detailed descriptions of conditions that have occurred since the adoption of SWRCB D-1641, approximately 15 years ago, for each of the environmental resources addressed in Chapters 5 through 21 of the EIS. The study area for each of the resources generally encompasses the CVP and SWP service area and areas along the water bodies downstream of the CVP and SWP reservoirs. In specific instances, additional areas are analyzed, such as consideration of Colorado River water supplies used by SWP water users in southern California.

In the Final EIS, additional details have been included in Section 5.3.3 of Chapter 5, Surface Water Resources and Water Supplies, and Section 6.3.3.6 of Chapter 6, Surface Water Quality, of the Draft EIS to describe historical responses by CVP and SWP to these drought conditions, including reductions in recent deliveries of CVP water and use of water from Millerton Lake to the San Joaquin River Exchange Contractors.

SLDMWA WWD SJRECWA 111: Please see response to Comment SLDMWA WWD SJRECWA 4.

SLDMWA WWD SJRECWA 112: Given the complexity of the water system and associated aquatic ecosystem, tools are not available to reliably quantify the

1 numbers of individuals of species, the viability of species populations, and the
 2 amount and quality of critical habitat. The analysis in the Draft EIS relied on
 3 modeling tools and qualitative analyses to provide indication of these attributes
 4 for comparison among alternatives rather than attempting absolute quantification.
 5 However, numerical indications of potential changes in species abundance and
 6 habitat availability are presented throughout the impact analysis in the Draft EIS.
 7 For example, the two life cycle models used to evaluate effects on winter-run
 8 Chinook Salmon provide output in terms of expected escapement. Similarly,
 9 SALMOD and the Egg Mortality Model provide outputs that indicate potential
 10 changes in salmon abundance. Habitat quality was addressed in terms of water
 11 temperature and WUA for salmonids and the fall abiotic index was used to
 12 quantify potential differences in Delta Smelt habitat. This information contributes
 13 to the subsequent effects analysis under Section 7 of the ESA, but as discussed in
 14 response to Comment SLDMWA WWD SJRECWA 25, the NEPA analysis does
 15 not address species viability or determine if the alternatives would be likely to
 16 cause jeopardy to the continued existence of the species, or destroy or adversely
 17 affect their critical habitat.

18 **SLDMWA WWD SJRECWA 113:** In Chapters 5 through 21, and their related
 19 appendices, the limitations of quantitative and qualitative analyses have been
 20 described. The issue of new science and uncertainty is particularly prevalent in
 21 the evaluation of aquatic resources in Chapter 9, Fish and Aquatic Resources. In
 22 Chapter 9, the impact discussions and impact conclusions have been revised to
 23 more definitely state the conclusions and provide decision makers and the public a
 24 clearer indication of the magnitude and materiality of the differences where a
 25 distinction among alternatives exists. In addition, text has been included the Final
 26 EIS to better reflect uncertainty and information in the recent scientific literature.

27 **SLDMWA WWD SJRECWA 114:** The initial Proposed Action was defined in
 28 the Notice of Intent, and is represented in Alternative 2 in the EIS. The Preferred
 29 Alternative is described in Section 1.5 of Chapter 1, Introduction, of the Final
 30 EIS. The justification for the selection of the Preferred Alternative will be
 31 presented in the Record of Decision. The Environmentally Preferred Alternative
 32 will be identified and disclosed in the Record of Decision, as required by the CEQ
 33 regulations.

34 **SLDMWA WWD SJRECWA 115:** The EIS does present a range of alternatives
 35 for the future coordinated long-term operation of the CVP and SWP that does
 36 provide a variety of methods to attempt to avoid jeopardy to the continued
 37 existence of the species, or destruction or adversely effects to their critical habitat.
 38 As described in response to Comment SLDMWA WWD SJRECWA 25, the
 39 screening criteria used to develop the range of alternatives in the EIS was based
 40 upon the purpose of the action (see Chapter 2, Purpose and Need), a
 41 determination if the concept addressed one or more significant issues, and if the
 42 concept was included in one or more alternatives (see Table 3.1 in Chapter 3,
 43 Description of Alternatives). The range of alternatives does include the No
 44 Action Alternative and Alternative 5 which are consistent with the 2008 USFWS

- 1 BO and 2009 NMFS BO. As noted in response 74 and 87, these BOs were upheld
2 by the Ninth Circuit in 2014.
- 3 **SLDMWA WWD SJRECWA 116:** The range of alternatives include concepts
4 that do not specifically affect CVP and SWP Delta exports, such as predation, trap
5 and haul concepts, and changes to allowable Delta and ocean harvest (see
6 Alternatives 3 and 4).
- 7 **SLDMWA WWD SJRECWA 117:** Reclamation is currently operating to the
8 2009 NMFS BO RPA regarding Fall X2 and believes that its inclusion in the
9 analysis of alternatives is appropriate and reasonable. The Final EIS includes
10 discussion of recent scientific information and the level of uncertainty regarding
11 the relation between X2 and Delta Smelt habitat. In response to scoping
12 comments, the Affected Environment section of the Final EIS also includes
13 discussion of factors influencing food availability for Delta Smelt and turbidity as
14 it relates to OMR flows. Reclamation considers the range of alternatives to be
15 sufficient for this EIS.
- 16 Reclamation recognizes that the available scientific information increases each
17 year as the volume of observed data increases. This information is included in
18 Chapters 5 through 21, as appropriate. Therefore, in addition to the alternatives
19 considered in the EIS, Reclamation is committed to continue working toward
20 improvements to the USFWS and NMFS RPA actions through either the adaptive
21 management process, Collaborative Science and Adaptive Management Program
22 (CSAMP) with the Collaborative Adaptive Management Team (CAMT), or other
23 similar ongoing or future efforts.
- 24 **SLDMWA WWD SJRECWA 118:** The range of alternatives included
25 alternatives that considered limitations on commercial fishing harvest
26 (Alternatives 3 and 4). The range of alternatives did include methods to maintain
27 cold water temperatures and changes to hatchery management plans, including
28 release timing of salmon (No Action Alternative, Alternative 2, and Alternative 5
29 related to the 2009 NMFS BO RPA actions).
- 30 **SLDMWA WWD SJRECWA 119:** The alternatives evaluated in the EIS include
31 actions intended to directly or indirectly address Green Sturgeon. The effects of
32 the alternatives related to green sturgeon were evaluated in Chapter 9, Fish and
33 Aquatic Resources, in the EIS. Reclamation considers the range of alternatives to
34 be sufficient for this EIS.
- 35 **SLDMWA WWD SJRECWA 120:** Mitigation measures are included in
36 Chapters 5 through 21 of the EIS to reduce adverse impacts of Alternatives 1
37 through 5 as compared to the No Action Alternative.
- 38 **SLDMWA WWD SJRECWA 121:** The responses to comments in Exhibit D are
39 presented in the responses to Comments SLDMWA WWD SJRECWA 137 and
40 SLDMWA WWD SJRECWA 147.
- 41 **SLDMWA WWD SJRECWA 122:** As described in Chapter 5, Surface Water
42 Resources and Water Supplies, and Chapter 7, Groundwater Resources and

Groundwater Quality, changes in CVP and SWP water deliveries have resulted in changes in groundwater elevations.

It should be noted that Figures 7.15 through 7.60 in Chapter 7, Groundwater Resources and Groundwater Quality, have been modified in the Final EIS to correct an error that increased the changes in groundwater elevation by a factor of 3.25. This miscalculation was due to an error in a model post-processor that generates the figures related to changing the values from CVHM Model output from meters to feet. Therefore, the results in these figures and the related text in Chapter 7 are less than reported in the Draft EIS. The figures and the text have been revised in the Final EIS. No changes are required to the CVHM model. The revised results in the figures and the text in Chapter 7 are consistent with the findings of the SWAP model.

SLDMWA WWD SJRECWA 123: As described in the response to Comment SLDMWA WWD SJRECWA 5, the SWAP model, a regional agricultural production and economic optimization model that simulates the decisions of farmers across 93 percent of agricultural land in California, was used to determine changes in agricultural land use and employment based upon changes in CVP and SWP water deliveries and cost-effective water supplies, as described in Appendix 12A, Statewide Agricultural Production Model (SWAP) Documentation, of the EIS. The SWAP model simulates changes in Year 2030 based upon economic optimization factors related to crop selection, water supplies, and other factors to maximize profits with consideration of resource constraints, technical production relationships, and market conditions. The model indicated that even with the cost of groundwater pumping from greater depths, the overall agricultural production would not change in response to changes in CVP and SWP water deliveries under the alternatives as compared to the No Action Alternative and the Second Basis of Comparison.

Changes in CVP and SWP water deliveries are within the overall range of projected water supplies in related urban water management plans, as described in Appendix 5D, Municipal and Industrial Water Demands and Supplies. It is anticipated that the communities would change their reliance on alternative water supplies, such as groundwater and recycled water, as described in the urban water management plans.

SLDMWA WWD SJRECWA 124: As described in Chapter 19, Socioeconomics, anticipated changes in socioeconomics conditions would occur with respect to recreation opportunities at San Luis Reservoir, freshwater and ocean fishing, and municipal and industrial water costs. The SWAP model output indicated that long-term agricultural land use, production, and employment would not change under any of the alternatives because groundwater use would change in response to changes in CVP and SWP water deliveries under the alternatives as compared to the No Action Alternative and the Second Basis of Comparison.

It is recognized that in the short-term, responses to reduced CVP and SWP water deliveries could be different than over the long-term. For example, during the recent drought some areas relied upon crop idling because expansion of

groundwater wellfields was not easily implemented in the short-term, and there were losses of jobs. The EIS analysis is considering the long-term changes by 2030, including agricultural water supplies based upon long-term economic modeling (see results of SWAP model runs in Chapter 12, Agricultural Resources). The SWAP model indicated that even with the cost of groundwater pumping from greater depths, the overall agricultural production could be maintained and agricultural-related jobs would be similar.

SLDMWA WWD SJRECWA 125: As described in Chapter 21, Environmental Justice, anticipated changes in environmental justice conditions would occur with respect to air quality in the San Joaquin Valley due to changes in use of groundwater pumps that are driven by diesel engines, and Delta mercury concentrations.

SLDMWA WWD SJRECWA 126: Chapter 9, Fish and Aquatic Resources, and Chapter 10, Terrestrial Biological Resources, include description of changes in biological resources and habitats related to changes in coordinated long-term operation of CVP and SWP in the alternatives, including changes in wetlands, riparian, and reservoir areas. This analysis includes evaluation of both the effects on species occupying CVP and SWP waterways as well as biological resources dependent on habitats supported by CVP and SWP water deliveries.

In response to Scoping comments, the Final EIS describes the level of uncertainty associated with species and various aspects of the ecosystem, and identifies areas of controversy, where relevant. In addition, the impact conclusions attempt to be definitive to the extent the analysis allows, and provide decision makers and the public a clear indication of the magnitude of the differences. However, because of the similarities in many of the alternatives and the level of uncertainty, a clear distinction is not always possible.

SLDMWA WWD SJRECWA 127: Chapter 6, Surface Water Quality, includes changes in water quality in the reservoirs, streams downstream of the reservoirs, and Delta. Additional details regarding water quality in the CVP and SWP service areas, including use of Delta water supplies to dilute the salinity of other water supplies, have been included in the Final EIS.

SLDMWA WWD SJRECWA 128: Chapter 16, Air Quality and Greenhouse Gas Emissions, includes changes in air quality in the San Joaquin Valley due to changes in use of groundwater pumps that are driven by diesel engines.

SLDMWA WWD SJRECWA 129: Chapter 11, Soils and Geology, discusses the potential for changes in soils and geology under the alternatives as compared to the No Action Alternative and the Second Basis of Comparison. Changes in subsidence potential are discussed in Chapter 7, Groundwater Resources and Groundwater Quality.

SLDMWA WWD SJRECWA 130: Chapter 14, Visual Resources, discusses the potential for changes in visual resources at the reservoirs and at the agricultural lands under the alternatives as compared to the No Action Alternative and the Second Basis of Comparison.

1 **SLDMWA WWD SJRECWA 131:** Chapter 15, Recreation Resources, discusses
2 the potential for changes in recreation resources under the alternatives as
3 compared to the No Action Alternative and the Second Basis of Comparison.

4 The alternatives do not include specific construction activities and agricultural
5 production does not changes between the alternatives; therefore, transportation
6 conditions would not change and was not analyzed in the EIS.

7 The effects of climate change are included in all analyses for implementation of
8 the alternatives as compared to the No Action Alternative and the Second Basis of
9 Comparison at the Year 2030. The discussion of the effects of the alternatives on
10 climate change potential has been expanded in Chapter 16 of the Final EIS.

11 **SLDMWA WWD SJRECWA 132:** Please see response to Comment SLDMWA
12 WWD SJRECWA 112.

13 **SLDMWA WWD SJRECWA 133:**

14 Cumulative projects and programs considered in the EIS are identified in Section
15 1.6 of Chapter 1, Introduction, of the Draft EIS; and further described in Section
16 3.5 of Chapter 3, Description of Alternatives. The cumulative effects analyses
17 presented in Chapters 5 through 21 consider if substantial adverse effects would
18 occur with implementation of the alternatives and the cumulative effects programs
19 and policies as compared to the No Action Alternative with implementation of the
20 cumulative effects programs and policies.

21 The No Action Alternative represents operations consistent with implementation
22 of the 2008 and 2009 Biological Opinions. This No Action Alternative represents
23 the current management direction and level of management intensity consistent
24 with the explanation of the No Action Alternative included in Council of
25 Environmental Quality's Forty Most Asked Questions (Question 3). NEPA does
26 not require agencies to mitigate impacts, nor does it require agencies to identify
27 mitigation associated with the No Action Alternative.

28 Reclamation has a legal obligation to comply with Section 7 of the ESA. Section
29 7 requires Reclamation to insure that actions it authorizes, funds or carries out do
30 not jeopardize the continued existence of any listed species and do not destroy or
31 adversely modify designated critical habitat. This legal obligation was confirmed
32 in the Central Valley Project Improvement Act. Most of Reclamation's contracts
33 with CVP water users limit Reclamation's liability for shortages associated with
34 meeting legal obligations of the CVP. Additionally, ESA prohibits unauthorized
35 take of listed species. DWR has chosen to ensure its compliance with the ESA
36 through coordinated operation of the SWP with the CVP and to implement the
37 2008 USFWS BO and 2009 NMFS BO.

38 Reclamation recognizes that some CVP water users either have initiated or are
39 initiating programs to increase water supplies with separate environmental
40 documentation (see Appendix 5D, Municipal and Industrial Water Demands and
41 Supplies). Other CVP water users may implement future projects to increase
42 water supplies, such as construction and operation of a desalination plants and
43 water recycling programs. None of these future actions are currently authorized

and are not being proposed by Reclamation as a part of this decision. Adoption of any of these types of these future actions, if authorized and funded by Reclamation, would require additional analysis under NEPA.

SLDMWA WWD SJRECWA 134: Please see response to Comment SLDMWA WWD SJRECWA 32.

SLDMWA WWD SJRECWA 135: The requirements of the Information Quality Act were used in the selection of analytical tools and other methodologies used in the Impact Analysis sections of Chapters 5 through 21. The methodologies were described in each chapter.

SLDMWA WWD SJRECWA 136: Comment noted.

SLDMWA WWD SJRECWA 137: Comment noted. The items addressed in this comment were considered in the preparation of the impact analyses in Chapters 5 through 21 of the EIS.

SLDMWA WWD SJRECWA 138: As described in response to Comment SLDMWA WWD SJRECWA 122, water resources analyses presented in Chapters 5 and 7 includes evaluation of changes in CVP and SWP water deliveries to agricultural and municipal and industrial customers, CVP and SWP reservoir storage, groundwater withdrawals, groundwater elevations, and potential for subsidence due to groundwater withdrawal patterns.

As described in response to Comment SLDMWA WWD SJRECWA 127, water quality conditions presented in Chapter 6 includes changes in water quality in the reservoirs, streams downstream of the reservoirs, and Delta. Additional details regarding water quality in the CVP and SWP service areas, including use of Delta water supplies to dilute the salinity of other water supplies, have been included in the Final EIS.

Potential changes related to public health risk, including available water for fighting wildland fires were evaluated in Chapter 18, Public Health.

SLDMWA WWD SJRECWA 139: As described in response to Comment SLDMWA WWD SJRECWA 123, agricultural land use and municipal land use was evaluated in Chapters 12 and 13. The analyses indicated that affordable alternative water supplies would be available in the Year 2030 to use when CVP and SWP water deliveries were reduced. Therefore, agricultural land uses would not change and related soil erosion would not increase, as described in Chapter 11. The urban water management projections for the Year 2030 were used to identify potential future projects, including numerous ongoing projects that had completed planning documents as of this time.

SLDMWA WWD SJRECWA 140: As described in response to Comment SLDMWA WWD SJRECWA 124, socioeconomic changes described in Chapter 19 were associated with changes in recreation opportunities at San Luis Reservoir, freshwater and ocean fishing, and municipal and industrial water costs. Based upon the SWAP and CWEST models, changes in employment would be less than 1 percent of the population in the regions due to the availability of alternative water supplies by the Year 2030.

1 It is recognized that in the short-term, responses to reduced CVP and SWP water
 2 deliveries could be different than over the long-term. For example, during the
 3 recent drought some areas relied upon crop idling because expansion of
 4 groundwater wellfields was not easily implemented in the short-term and job
 5 losses occurred. The EIS analysis is considering the long-term changes by 2030,
 6 including agricultural water supplies based upon long-term economic modeling
 7 (see results of SWAP model runs in Chapter 12, Agricultural Resources). The
 8 SWAP model indicated that even with the cost of groundwater pumping from
 9 greater depths, the overall agricultural production could be maintained and
 10 agricultural-related jobs would be similar.

11 **SLDMWA WWD SJRECWA 141:** As described in response to Comment
 12 SLDMWA WWD SJRECWA 125, anticipated changes in environmental justice
 13 conditions, as described in Chapter 21, would occur with respect to air quality in
 14 the San Joaquin Valley due to changes in use of groundwater pumps that are
 15 driven by diesel engines, and Delta mercury concentrations.

16 It is recognized that in the short-term, responses to reduced CVP and SWP water
 17 deliveries could be different than over the long-term. For example, during the
 18 recent drought some areas relied upon crop idling because expansion of
 19 groundwater wellfields was not easily implemented in the short-term and job
 20 losses occurred. The EIS analysis is considering the long-term changes by 2030,
 21 including agricultural water supplies based upon long-term economic modeling
 22 (see results of SWAP model runs in Chapter 12, Agricultural Resources). The
 23 SWAP model indicated that even with the cost of groundwater pumping from
 24 greater depths, the overall agricultural production could be maintained and
 25 agricultural-related jobs would be similar.

26 **SLDMWA WWD SJRECWA 142:** As described in response to Comment
 27 SLDMWA WWD SJRECWA 126, anticipated changes in biological resources (as
 28 described in Chapters 9 and 10) would occur biological resources and habitats
 29 related to changes in coordinated long-term operation of CVP and SWP in the
 30 alternatives, including changes in wetlands, riparian, and reservoir areas.

31 **SLDMWA WWD SJRECWA 143:** As described in response to Comment
 32 SLDMWA WWD SJRECWA 127, anticipated changes in surface water quality
 33 (as described in Chapter 6) would occur in the reservoirs, streams downstream of
 34 the reservoirs, and Delta. Additional details regarding water quality in the CVP
 35 and SWP service areas, including use of Delta water supplies to dilute the salinity
 36 of other water supplies and use for groundwater recharge and water recycling,
 37 have been included in the Final EIS. Chapter 6 also describes changes in
 38 selenium concentrations in the Delta due to runoff from agricultural and wetlands
 39 areas.

40 **SLDMWA WWD SJRECWA 144:** As described in response to Comment
 41 SLDMWA WWD SJRECWA 128, anticipated changes in air quality (as
 42 described in Chapter 16) would occur in the San Joaquin Valley due to changes in
 43 use of groundwater pumps that are driven by diesel engines. No changes in dust
 44 generation from agricultural fields are anticipated because agricultural production

- 1 would be similar under all of the alternatives, the No Action Alternative, and the
2 Second Basis of Comparison.
- 3 **SLDMWA WWD SJRECWA 145:** As described in response to Comment
4 SLDMWA WWD SJRECWA 129, changes in soils and geology (as described in
5 Chapter 11) are not anticipated to occur agricultural and municipal land uses
6 would be similar under all of the alternatives, the No Action Alternative, and the
7 Second Basis of Comparison. Changes in subsidence potential are discussed in
8 Chapter 7, Groundwater Resources and Groundwater Quality.
- 9 **SLDMWA WWD SJRECWA 146:** As described in response to Comment
10 SLDMWA WWD SJRECWA 130, changes in visual resources (as described in
11 Chapter 14) were analyzed at the reservoirs and at the agricultural lands under the
12 alternatives as compared to the No Action Alternative and the Second Basis of
13 Comparison.
- 14 **SLDMWA WWD SJRECWA 147:** As described in response to Comment
15 SLDMWA WWD SJRECWA 131, changes in recreation resources (as described
16 in Chapter 15) were evaluated at CVP and SWP reservoirs and the streams
17 downstream of the reservoirs, and for Delta sport fishing.
- 18 The alternatives do not include specific construction activities and agricultural
19 production does not changes between the alternatives; therefore, transportation
20 conditions would not change and was not analyzed in the EIS.
- 21 The effects of climate change are included in all analyses for implementation of
22 the alternatives as compared to the No Action Alternative and the Second Basis of
23 Comparison at the Year 2030. The discussion of the effects of the alternatives on
24 climate change potential has been expanded in Chapter 16 of the Final EIS.

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1 **1.C.2.1 Attachments to Comments of Central Delta**
2 **Water Agency**

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ESTIMATED SEASONAL NATURAL RUNOFF NORTH COAST AREA Klamath, Eel, Van Duzen, Mad, and Russian Rivers - 1917-18 to 1946-47

53 year average used by the DEPARTMENT of WATER RESOURCES.

18,820,000 acre feet (100.0%)

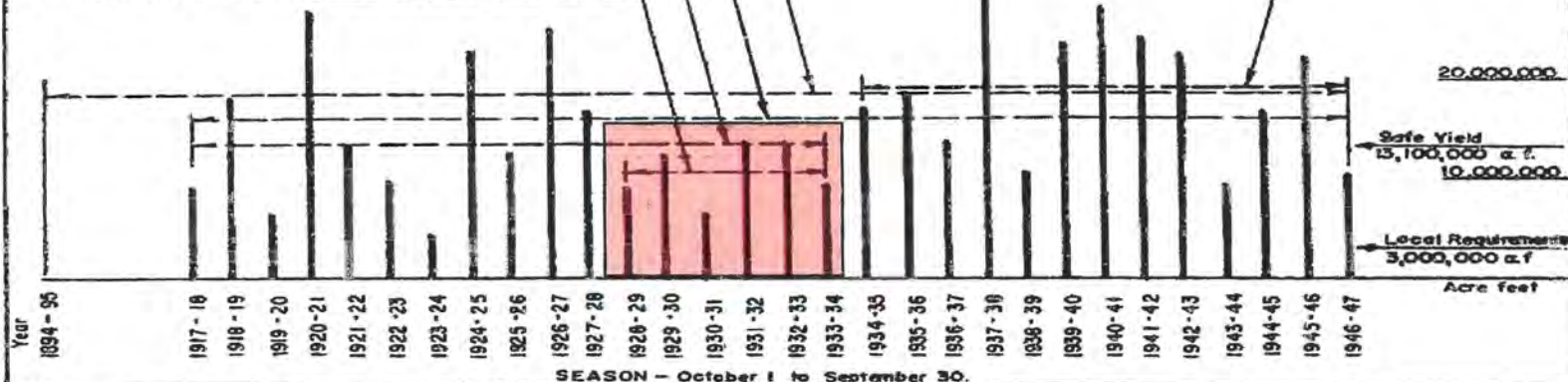
30 year average 16,240,000 acre feet (86.3%)

17 dry year average 13,700,000 acre feet (72.3%)

6 drought year average 10,930,000 acre feet (58.7%)

13 wet year average

19,500,000 acre feet (103.6%)



Surplus
7,930,000 AF/Y

ESTIMATED SEASONAL NATURAL RUNOFF

CENTRAL VALLEY 1917-18 to 1946-47

53 year average used by the DEPARTMENT of WATER RESOURCES.

33,800,000 acre feet (100.0%)

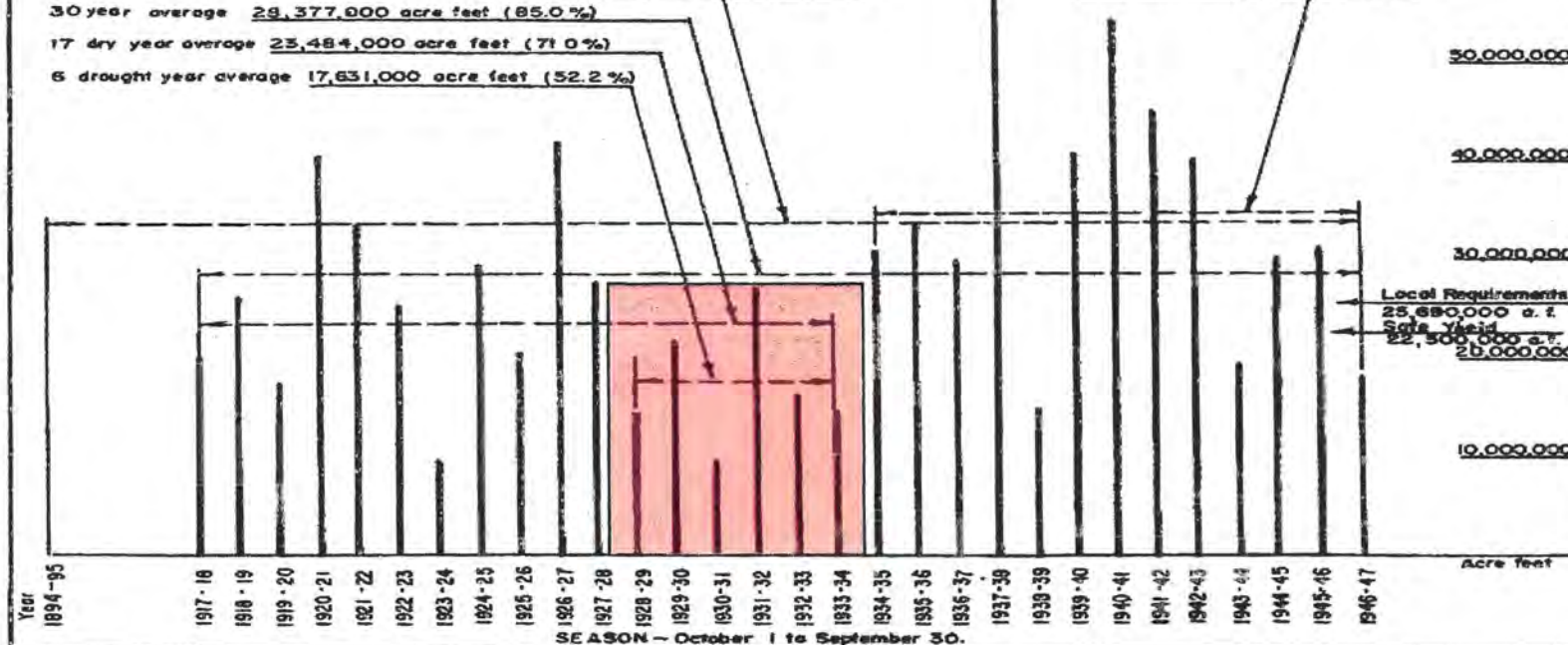
30 year average 29,377,000 acre feet (85.0%)

17 dry year average 23,484,000 acre feet (71.0%)

6 drought year average 17,631,000 acre feet (52.2%)

13 wet year average

34,750,000 acre feet (103.0%)



SHORTAGE
8,049,000 AF/Y

Preliminary Edition

John A. Wilson



Bulletin No. 76

DELTA WATER FACILITIES



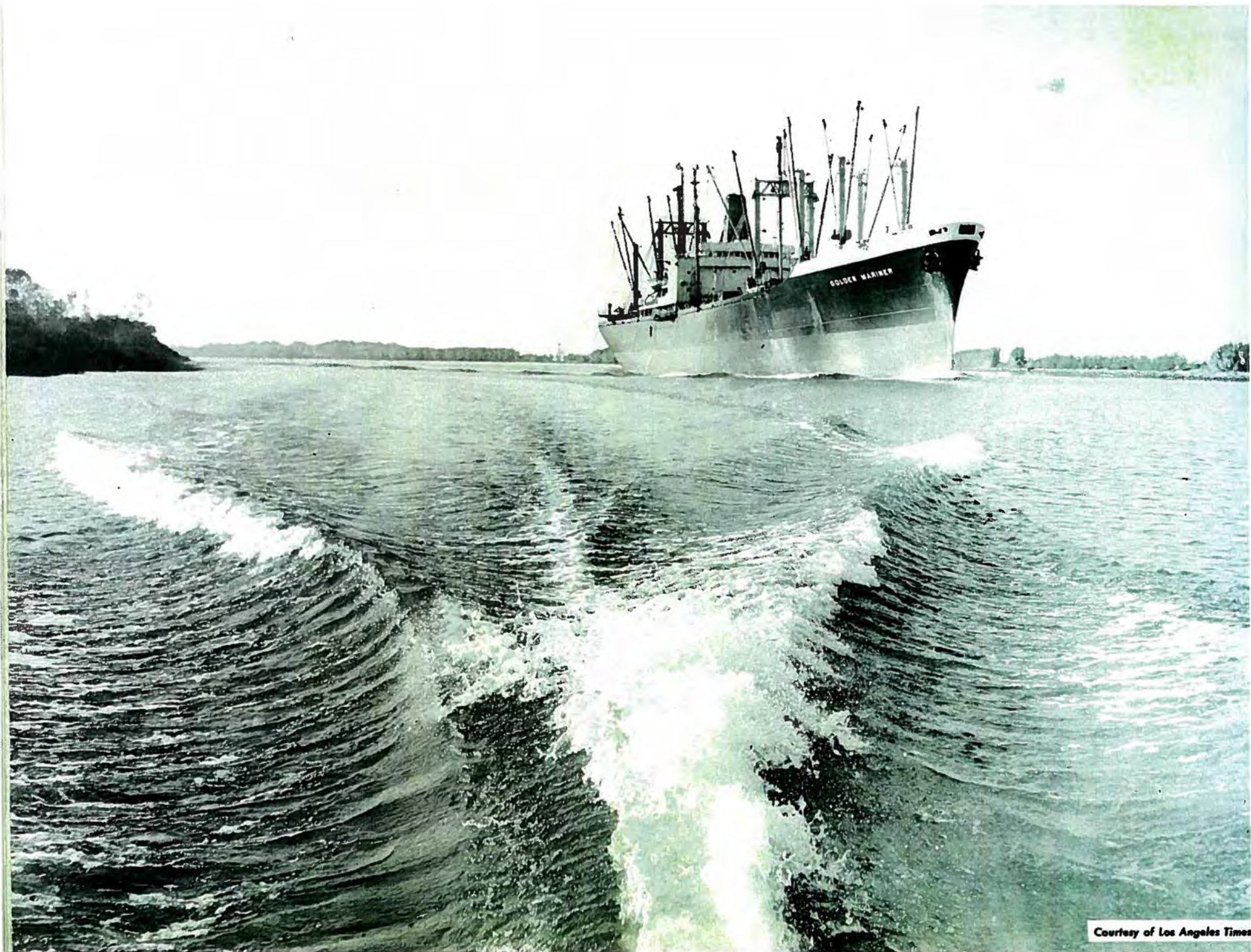
Exhibit "B"

EDMUND G. BROWN
Governor
State of California



December, 1960

HARVEY O. BANKS
Director
Department of Water Resources



Courtesy of Los Angeles Times

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

Bulletin No. 76

REPORT TO THE
CALIFORNIA STATE LEGISLATURE
ON THE

DELTA WATER FACILITIES

AS AN INTEGRAL FEATURE OF
THE STATE WATER RESOURCES DEVELOPMENT SYSTEM

EDMUND G. BROWN
Governor



December, 1960

STATEMENT OF CLARIFICATION

This preliminary edition presents a comparison of alternative solutions to the Delta problems. This bulletin shows that the Single Purpose Delta Water Project is the essential minimum project for successful operation of the State Water Facilities. This bulletin also presents, for local consideration, optional modifications of the Single Purpose Delta Water Project which would provide additional local benefits.

The evaluation of project accomplishments, benefit-cost ratios, and costs of project services, are intended only to indicate the relative merits of these solutions and should not be considered in terms of absolute values. Benefits related to recreation are evaluated for comparative purposes. Detailed recreation studies, presently in progress, will indicate specific recreation benefits.

Subsequent to local review and public hearings on this preliminary edition, a final edition will be prepared setting forth an adopted plan. The adopted plan will include, in addition to the essential minimum facilities, those justifiable optional modifications requested by local entities.

John A. Wilson

HARVEY O. BANKS
Director

Letters

HARVEY O. BANKS
Director

EDMUND G. BROWN
Governor

ADDRESS REPLY TO
P. O. BOX 290 SACRAMENTO 9
CALIF. 95833



STATE OF CALIFORNIA
Department of Water Resources
SACRAMENTO

December 30, 1960

Honorable Edmund G. Brown, Governor
Members of the Legislature of the
State of California

Gentlemen:

I have the honor to transmit herewith a preliminary edition of Bulletin No. 76, "Delta Water Facilities". This bulletin summarizes the results of investigations conducted pursuant to the Ashire-Kelly Salinity Control Barrier Acts of 1955 and 1957, Chapter 1434, Statutes of 1955, and Chapter 2092, Statutes of 1957, as amended by Chapters 1765 and 2038, Statutes of 1959.

Bulletin No. 76 presents findings and conclusions regarding the feasibility of alternative plans for the Delta feature of the State Water Facilities included in the Burns-Porter Act approved by the electorate on November 8, 1960. The Delta water facilities would (1) provide adequate water supplies throughout the Delta, (2) transport water across the Delta without undue loss or deterioration in quality, (3) provide flood and seepage control to Delta islands, (4) provide improved vehicular transportation access, and (5) minimize effects on existing recreation development and enhance recreation growth. All of the alternative plans would accomplish the first two objectives, and two alternative plans would also accomplish the other objectives.

Further planning for Delta water facilities should include consideration of joint financing and construction by federal, state and local interests. Facilities for flood and seepage control, vehicular transportation and recreation would not have to be constructed unless local governmental agencies desire these works and are willing to share in certain costs thereof. There would be some conflicts of interest in operation of these facilities which must be resolved prior to a decision by local interests regarding the extent of local participation. To this end, it is recommended that a period of a few months be allowed for local review and resolution of differences, after which public hearings should be held by the California Water Commission and the Department. Following the public hearings, a final edition of Bulletin No. 76, incorporating any necessary modifications, should be published.

Very truly yours,

Harvey O. Banks
HARVEY O. BANKS
Director

BOARD OF CONSULTING ENGINEERS

November 16, 1960

Mr. Harvey O. Banks, Director
Department of Water Resources
Sacramento, California

Dear Mr. Banks:

This Board of Consulting Engineers which was active in 1958 was reconvened in April, 1960 and has met from time to time with your staff. Thus we have followed the preparation of this report and have commented to you following each meeting.

The Delta Water Facilities constitute needed works vital to the transfer of northern water into and across the Delta to provide water for use in the Delta and for export to water deficient areas along the Coast, in the San Joaquin Valley and to Southern California, to be financed under the California Water Resources Development Bond Act. The Board is of the opinion that the gross future water requirements for municipal and industrial purposes in the Delta have been very liberally estimated.

The Board is of the opinion that the engineering studies, designs and estimates are adequate for the purpose of this planning report and we support the conclusions and recommendations embodied therein.

We believe that the Chippe Island Barrier Project should not be authorized or constructed owing to its high cost of nearly \$200 million which substantially exceeds project benefits.

The Delta Water Project, including such economically desirable flood control, seepage control, transportation and recreational features as may be agreed upon by local Delta beneficiaries willing to share in costs, would meet all water requirements with maximum net project benefits, and should be constructed under the Bond Act.

Respectfully submitted,

H. A. Einstein
H. A. Einstein

O. S. Porter
O. S. Porter

Ray K. Lindsey
Ray K. Lindsey

Samuel B. Morris
Samuel B. Morris, Chairman

Preface

This bulletin summarizes the engineering and economic conclusions and recommendations concerning the feasibility of providing salinity control, water supply, flood and seepage control, transportation facilities, and recreation development for the Sacramento-San Joaquin Delta, and conserving and making the most beneficial use of a major portion of the water resources of the State. Alternative plans for accomplishing some or all of these objectives are presented and compared to indicate their relative merits and to guide the selection of facilities to be constructed.

Findings presented herein are the result of intensive studies conducted during a five-year period. Previous studies and cooperative investigations by various public and private agencies and individuals were utilized in development of the plans. The cooperation of these individuals and agencies is gratefully acknowledged.

Study procedures and analyses are summarized in six supporting office reports, which are available to interested agencies and individuals. The subjects and titles of these reports are:

- Salinity Incursion and Water Resources
- Delta Water Requirements
- Channel Hydraulics and Flood Channel Design
- Recreation
- Plans, Designs, and Cost Estimates
- Economic Aspects

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Salinity Control Studies

1879-1880, WM. HAM. HALL

Salinity incursion into the Delta, which was recorded in 1841 and 1871, was recognized by the early settlers as a potential problem to water supplies, and a salt water barrier was proposed in the 1860's. State Engineer Wm. Ham. Hall subsequently studied a barrier in conjunction with flood control and concluded that, while a physical barrier could be constructed, the costs would exceed the benefits.

1924-1928, WALKER YOUNG INVESTIGATION

A series of subnormal water supply years began in 1917 and various proposals for barriers were advanced during the early 1920's. In cooperation with the State of California and the Sacramento Valley Development Association, the U. S. Bureau of Reclamation, under the direction of Walker Young, extensively investigated four alternative barrier sites and concluded that it was "... physically feasible to construct a Salt Water Barrier at any one of the sites investigated ..." It was recognized that without a barrier, "... salinity conditions will become more acute unless mountain storage is provided to be released during periods of low river discharge ..." Economic analyses of barriers were not made by Mr. Young.

1929-1931, BULLETINS NOS. 27 AND 28

Following investigation of the physical feasibility of barriers, the State Division of Water Resources studied the phenomena of salinity incursion and the economics of barriers. In Bulletin No. 27, "Variation and Control of Salinity in Sacramento-San Joaquin Delta and Upper San Francisco Bay," it was concluded that "... invasion of salinity ... as far as the lower end of the ... Delta is a natural phenomenon which, in varying degree, has occurred each year as far back as historical records reveal." It was also concluded that the Delta could be protected from saline invasion and be assured of ample and dependable water supplies if mountain storage were utilized to provide a controlled rate of outflow from the Delta.

In Bulletin No. 28, "Economic Aspects of a Salt Water Barrier," it was concluded that it was not economically justifiable to construct a barrier. With conditions of upstream water use at that time, it was concluded that the most economical solution to salinity incursion and provision of adequate water supplies in the Delta could be achieved by constructing upstream storage and controlling rates of outflow during periods of insufficient natural outflow.

1953, ABSHIRE-KELLY SALINITY CONTROL BARRIER ACT

Shasta Reservoir on the Sacramento River was constructed and began operation in 1944 for salinity control and other purposes. Expanding water requirements in the Central Valley and San Francisco Bay area stimulated reconsideration of barrier plans for water conservation and related purposes. Seven alternative plans for barriers in the Bay and Delta system were investigated by a Board of Consultants and the State Division of Water Resources for the California Water Project Authority. The Board of Consultants concluded that barriers in the San Francisco Bay system would not be functionally feasible due to the uncertainty of the quality of water in a barrier pool. It was recommended by the Division of Water Resources that "Further consideration be given only to ... barriers ... at or upstream from the Chipps Island site" at the outlet of the Delta.

1955, ABSHIRE-KELLY SALINITY CONTROL BARRIER ACT

Additional legislation specified study of a system of works in the Delta, referred to as the Junction Point Barrier Plan, and the Chipps Island Barrier Plan. The principal purposes of these studies were to develop complete plans for water supply in the San Francisco Bay area and to provide salinity control and urgently needed flood protection in the Delta.

CHAPTER 1434

An act to provide for a study of the junction point barrier and appurtenant facilities, the Abshire-Kelly Salinity Control Barrier Act of 1955, relating to barriers for salinity and flood control purposes, declaring the urgency thereof, to take effect immediately.

[Approved by Governor June 27, 1955. Filed with Secretary of State June 28, 1955.]

The people of the State of California do enact as follows:

SECTION 1. There is hereby appropriated to the Water Project Authority the sum of one hundred thousand dollars (\$100,000), payable from the Flood Control Fund of 1948, to initiate the further investigation and study of the Junction Point Barrier and Chipps Island Barrier and appurtenant facilities, as such barriers and facilities are described in the report of the Water Project Authority to the Legislature entitled "Feasibility of Construction by the State of Barriers in the San Francisco Bay System," dated March, 1955, for the purposes of developing complete plans of the means of accomplishing delivery of fresh water to the San Francisco Bay area, including the Counties of Solano, Sonoma, Napa, Marin, Contra Costa, Alameda, Santa Clara, San Benito, and San Mateo, and the City and County of San Francisco, providing urgently needed flood protection to agricultural lands in the Sacramento-San Joaquin Delta, conducting subsurface exploration work in the delta and designing facilities appurtenant to the cross-delta aqueduct, obtaining more complete information on the hydrology of the delta, and studying integration of the proposed project in the California Water Plan.

Sec. 2. The Water Project Authority may contract with such other public agencies, federal, state, or local, as it deems necessary for the rendition and affording of such services, facilities, studies, and reports to the Water Project Authority as will best assist it to carry out this act. The Water Project Authority may also employ, by contract or otherwise, such private consulting engineering and other technical services as it deems necessary for the rendition and affording of such services, facilities, studies, and reports as will best assist it to carry out this act.

Sec. 3. It is the intent of the Legislature that in conducting the study and investigation the Water Project Authority shall confer and exchange information with and shall seek the participation of the United States Navy, the United States Bureau of Reclamation, the United States Corps of Engineers and the local port districts to the extent possible.

Sec. 4. The Water Project Authority shall report to the Legislature the result of its study and investigation not later than March 30, 1957.

Sec. 5. This act shall be known and may be cited as the Abshire-Kelly Salinity Control Barrier Act of 1955.

Sec. 6. This act is an urgency measure necessary for the immediate preservation of the public peace, health or safety within the meaning of Article IV of the Constitution and shall go into immediate effect. The facts constituting such necessity are:

The areas adjacent to the San Francisco Bay urgently need an adequate supply of fresh water for domestic and industrial uses. It is essential to the public health, safety and welfare that a study of salinity control barriers as a means of securing such a supply of fresh water, be undertaken without delay.

A four-year investigation was contemplated, and an interim report, Bulletin No. 60, "Salinity Control Barrier Investigation", was published in March 1957, by the Department of Water Resources. This report outlined a water plan for the San Francisco Bay area, and recommended that the North Bay Aqueduct be authorized for construction. The North Bay Aqueduct was authorized by the Legislature in 1957. The report also compared the Biemond Plan, a system of works in the Delta, with the Chipps Island Barrier Plan, and recommended that further study be limited to the Biemond Plan.

1957, ABSHIRE-KELLY SALINITY CONTROL BARRIER ACT

The Legislature concurred in limiting further study to the Biemond Plan and stressed the need for improving the quality of water in the Delta and making the most beneficial use of the water resources of the State. A report on the further studies was scheduled for release by March 30, 1959.

CHAPTER 2092

An act relating to barriers for salinity and flood control purposes.

[Approved by Governor July 1, 1957. Filed with Secretary of State July 12, 1957.]

The people of the State of California do enact as follows:

SECTION 1. The Department of Water Resources may limit its studies of salinity control barriers to the Biemond Plan as described in Bulletin No. 60 of the Department of Water Resources entitled "Salinity Control Barrier Investigation," dated March, 1957, subject to such modifications thereof as the department may adopt, said studies being for the purposes of developing complete plans of the means of accomplishing delivery of fresh water to the Counties of Solano, Sonoma, Napa

and Marin, providing urgently needed flood protection to agricultural lands in the Sacramento-San Joaquin Delta, accomplishing salinity control, improving the quality of water exported from the delta to the San Francisco Bay area, San Joaquin Valley, and southern portions of California, making the most beneficial use of the water resources of the State, and studying integration of the proposed project in The California Water Plan.

Sec. 2. The department may contract with such other public agencies, federal, state or local, as it deems necessary for the rendition and affording of such services, facilities, studies, and reports to the department as will best assist it to carry out this act.

Sec. 3. It is the intent of the Legislature that in conducting the study and investigation the department shall confer and exchange information with and shall seek the participation of the United States Navy, the United States Bureau of Reclamation, the United States Corps of Engineers, and the local port districts to the extent possible.

Sec. 4. The department shall submit a report to the Legislature stating the result of its study and investigation not later than March 30, 1959.

Sec. 5. This act shall be known and may be cited as the "Abshire-Kelly Salinity Control Barrier Act of 1957."

1959, ADDITIONAL LEGISLATION

The potential expansion of water requirements of the urban and industrial complex in the western Delta area, and greater upstream water use with resultant depletion of inflow to and outflow from the Delta, indicated need for more concentrated study of the water requirements and supplies of the Delta. Legislation was enacted in 1959 to undertake studies of the type and extent of future water requirements of lands which can be served from present channels in the western Delta, effects of upstream water uses on Delta supplies, plans for water service and costs thereof, and economic and financial feasibility of the plans. Additional legislation authorized studies of the most economical and efficient procedures of constructing levees for flood control.

CHAPTER 1765

An act providing for the investigation of water supplies and flood control levees for the Sacramento-San Joaquin Delta and making an appropriation therefor.

[Approved by Governor July 10, 1959. Filed with Secretary of State July 12, 1959.]

The people of the State of California do enact as follows:

SECTION 1. The Department of Water Resources shall investigate the water supplies for the Sacramento-San Joaquin Delta. The investigation shall include, among other things: (1) the type and extent of the future water requirements of lands which can be served from present channels in the western Delta; (2) the extent and nature of effects of upstream water developments on water supply available to such lands; (3) the development of plans for water service to such lands and estimates of costs thereof; and (4) economic and financial analyses of such plans. In carrying out the investigation, the department shall seek the co-operation and assistance of the counties and other local agencies and entities in the Sacramento-San Joaquin Delta and of the United States; may enter into contracts with such entities to assist it in carrying out the purposes of such investigation, and shall consult with and keep appropriate legislative committees informed of the progress of this work.

SEC. 2. There is appropriated from the California Water Fund to the Department of Water Resources the sum of two hundred thousand dollars (\$200,000) to be expended for the purposes of this act.

SEC. 3. Section 4.5 is added to the Abshire-Kelly Salinity Control Barrier Act of 1957 (Chapter 2092, Statutes of 1957), to read:

SEC. 4.5. As a part of the studies being performed hereunder and to obtain such information as may be required to implement the plan included in the report referred to in Section 4, the department may conduct studies and investigations to determine the most economical and efficient type and methods and procedures of construction to provide an adequate levee system in the Delta.

SEC. 4. There is hereby appropriated to the Department of Water Resources from the California Water Fund the sum of two hundred thirty thousand dollars (\$230,000), of which one hundred eighty thousand dollars (\$180,000), may be expended for the studies and investigations authorized by Section 3 hereof, and fifty thousand dollars (\$50,000) may be expended for such remedial work as may be necessary in connection with levee tests being performed as a part of the studies and investigations authorized by Section 3 hereof.

Intensive studies were made of the future economic growth of lands which can be served from channels in the western Delta. Particular attention was given to the future municipal and industrial water needs in the area and the future water supplies available in the Delta. Due to the expanded scope of the studies, the report was delayed.

CHAPTER 2092

An act to amend Section 4 of Chapter 2092, Statutes of 1957, relating to barriers for salinity and flood control purposes.

[Approved by Governor July 17, 1959. Filed with Secretary of State July 20, 1959.]

The people of the State of California do enact as follows:

SECTION 1. Section 4 of Chapter 2092, Statutes of 1957, is amended to read:

SEC. 4. The department shall submit a report to the Legislature stating the result of its study and investigation not later than January 2, 1961.

The unique character of the water supply problems of the Delta was recognized by the State Legislature when it amended the California Water Code in 1959 to include general policy regarding the Delta. This legislation calls for provision of salinity control and adequate water supplies in the Delta and states that water to which the users within the Delta are entitled should not be exported. The policy in this act is basic to the planning and operation of all works in the Delta or diversions therefrom.

CHAPTER 1766

An act to add Part 4.5 (commencing at Section 12200) to Division 6 of the Water Code, relating to delivery of surplus water into, and extractions thereof for exportation from, the Sacramento-San Joaquin Delta.

[Approved by Governor July 19, 1959. Filed with Secretary of State July 19, 1959.]

The people of the State of California do enact as follows:

SECTION 1. Part 4.5 (commencing at Section 12200) is added to Division 6 of the Water Code, to read:

PART 4.5. SACRAMENTO-SAN JOAQUIN DELTA

CHAPTER 1. GENERAL POLICY

12200. The Legislature hereby finds that the water problems of the Sacramento-San Joaquin Delta are unique within the State; the Sacramento and San Joaquin Rivers join at the Sacramento-San Joaquin Delta to discharge their fresh water flows into Suisun, San Pablo and San Francisco Bays and thence into the Pacific Ocean; the merging of fresh water with saline bay waters and drainage waters and the withdrawal of fresh water for beneficial uses creates an acute problem of salinity intrusion into the vast network of channels

and sloughs of the Delta; the State Water Resources Development System has as one of its objectives the transfer of waters from water-surplus areas in the Sacramento Valley and the north coastal area to water-deficient areas to the south and west of the Sacramento-San Joaquin Delta via the Delta; water surplus to the needs of the areas in which it originates is gathered in the Delta and thereby provides a common source of fresh water supply for water-deficient areas. It is, therefore, hereby declared that a general law cannot be made applicable to said Delta and that the enactment of this law is necessary for the protection, conservation, development, control and use of the waters in the Delta for the public good.

12201. The Legislature finds that the maintenance of an adequate water supply in the Delta sufficient to maintain and expand agriculture, industry, urban, and recreational development in the Delta area as set forth in Section 12220, Chapter 2, of this part, and to provide a common source of fresh water for export to areas of water deficiency is necessary to the peace, health, safety and welfare of the people of the State, except that delivery of such water shall be subject to the provisions of Section 10505 and Sections 11460 to 11463, inclusive, of this code.

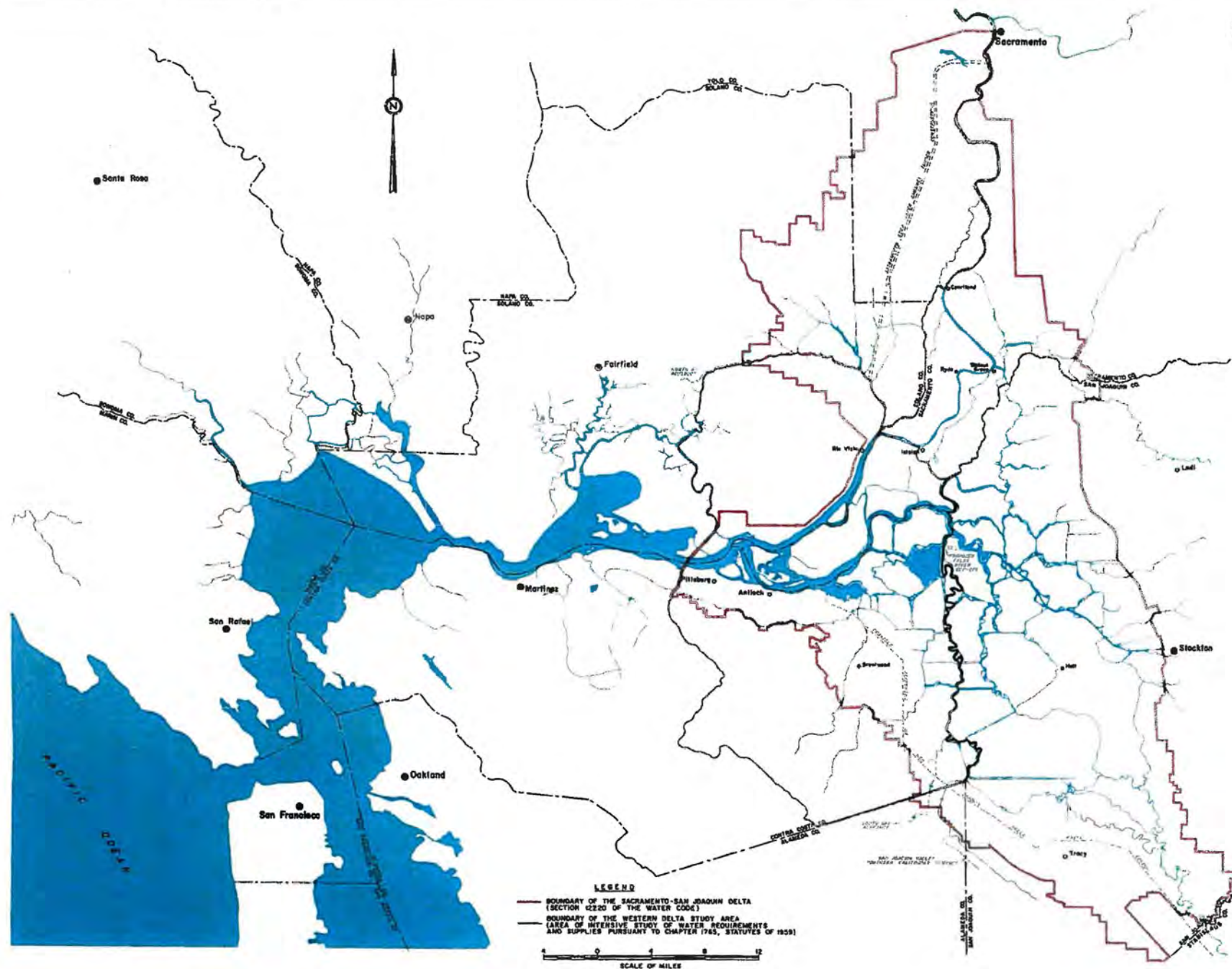
12202. Among the functions to be provided by the State Water Resources Development System, in coordination with the activities of the United States in providing salinity control for the Delta through operation of the Federal Central Valley Project, shall be the provision of salinity control and an adequate water supply for the users of water in the Sacramento-San Joaquin Delta. If it is determined to be in the public interest to provide a substitute water supply to the users in said Delta in lieu of that which would be provided as a result of salinity control no added financial burden shall be placed upon said Delta water users solely by virtue of such substitution. Delivery of said substitute water supply shall be subject to the provisions of Section 10505 and Sections 11460 to 11463, inclusive, of this code.

12203. It is hereby declared to be the policy of the State that no person, corporation or public or private agency or the State or the United States should divert water from the channels of the Sacramento-San Joaquin Delta to which the users within said Delta are entitled.

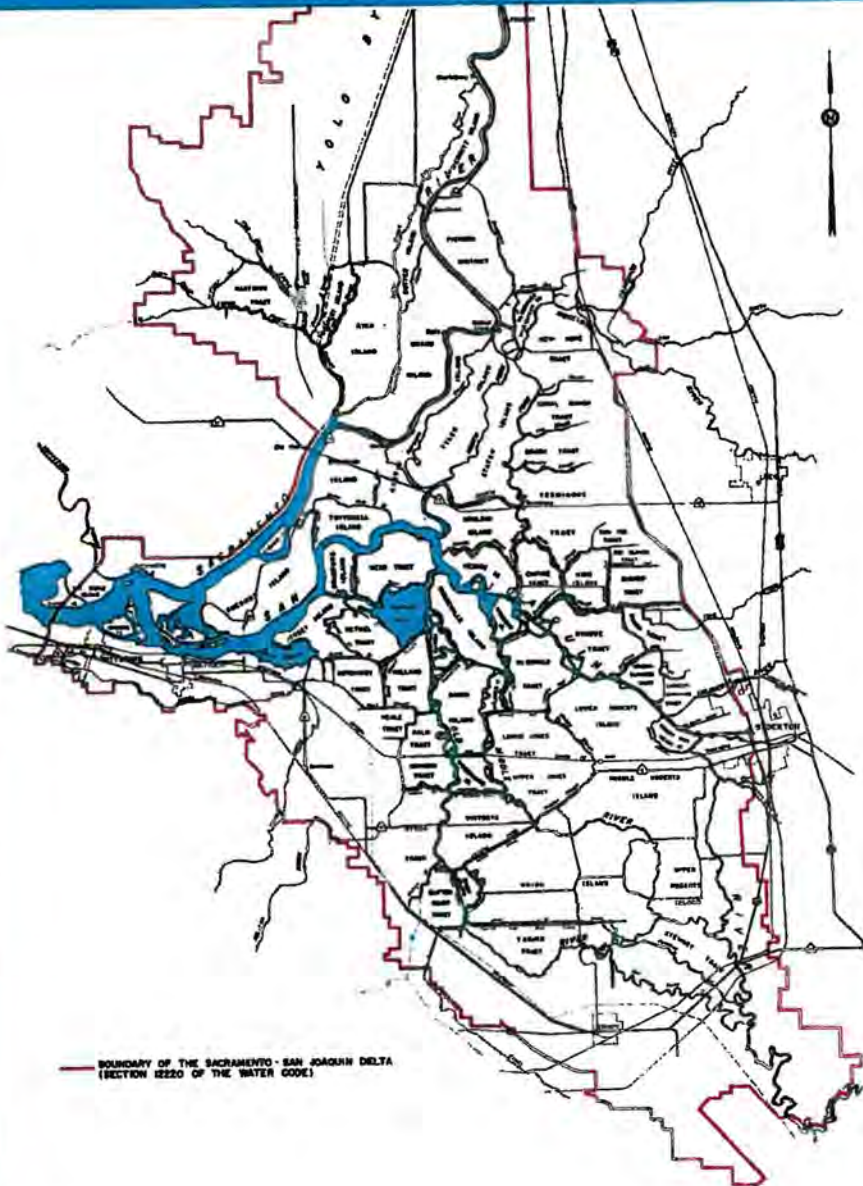
12204. In determining the availability of water for export from the Sacramento-San Joaquin Delta no water shall be exported which is necessary to meet the requirements of Sections 12202 and 12203 of this chapter.

12205. It is the policy of the State that the operation and management of releases from storage into the Sacramento-San Joaquin Delta of water for use outside the area in which such water originates shall be integrated to the maximum extent possible in order to permit the fulfillment of the objectives of this part.

This legislation also described the area of the Delta to which the general policy applies. The boundary of the Delta, as described in Section 12220 of the Water Code, is indicated on the facing map. The area considered in the intensive studies of water requirements and supplies is described as the Western Delta Study Area.



The Delta—its geography and economy

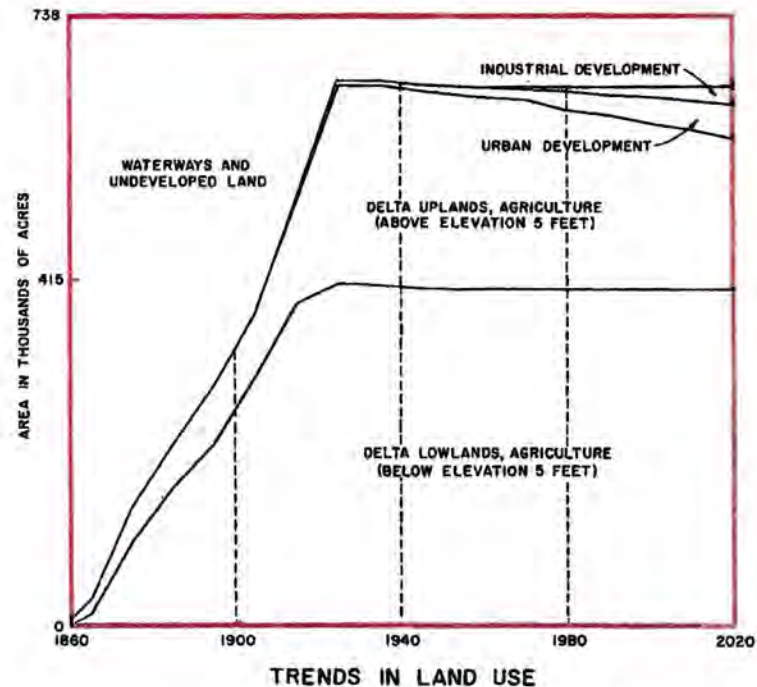
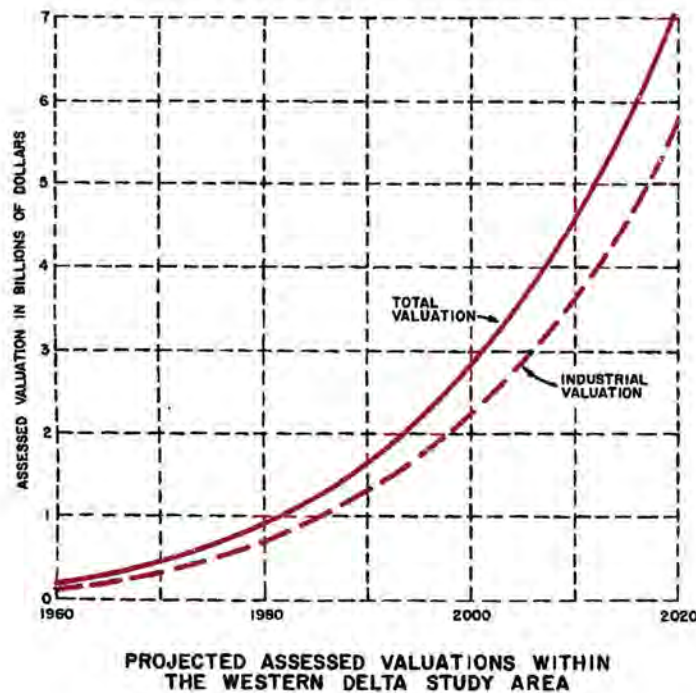


The Delta, located at the confluence of the Sacramento and San Joaquin Rivers system, is a unique feature of the California landscape. The Delta encompasses some 738,000 acres, interlaced with 700 miles of meandering waterways covering 50,000 acres. About 415,000 acres of land, referred to as Delta Lowlands, lie between elevations of 5 feet above and 20 feet below sea level. This area is composed of peat, organic sediments, and alluvium, and is protected from flood water and high tides by man-made levees. The extensive waterways afford opportunity for shipping and provide a wonderland for boating and water sports. These same waterways must safely discharge flood waters of the Central Valley.

The fortunate combination of fertile soils, convenient water supplies, and shallow-draft shipping to central California markets led to development of an intensified agricultural economy in the Delta. Initial reclamation of the marshlands began slowly in the 1850's, but rapidly expanded after state assistance was provided by a swampland act in 1861. By 1930, all but minor areas of the swamplands had been leveed and were in production.

The Delta has historically been noted for its asparagus, potatoes, celery, and varied truck crops. Recently, greater emphasis has been placed on field corn, milo, grain, and hay, although the Delta still produces most of the nation's canned asparagus. The Delta's agricultural economy for many years was dependent upon repulsion of ocean salinity by fresh water outflow, which fluctuated widely, but during the past sixteen years has been protected largely by releases from upstream reservoirs of the Federal Central Valley Project during summer months.

Several towns and cities are located in the upland areas and an industrial complex is expanding in the western part of the Delta. Early industrial development centered around food and kindred products, steel production, fibreboard, lumber, and ship-building activity. Large water-using industries, such as steel, paper products, and chemicals, have developed in the western area where water, rail, and highway transportation, coupled with water supplies, has stimulated growth. The manufacturing employment in this area was about 10,000 people in 1960.



A deep-draft ship channel serving commercial and military installations terminates at Stockton, and another is being constructed to Sacramento. Water-borne shipments in the Delta amounted to about 6,000,000 tons annually in recent years.

The Delta encompasses one of California's most important high quality natural gas fields. Since 1941 the field has produced about 300,000,000 cubic feet of methane gas for use in the San Francisco Bay area.

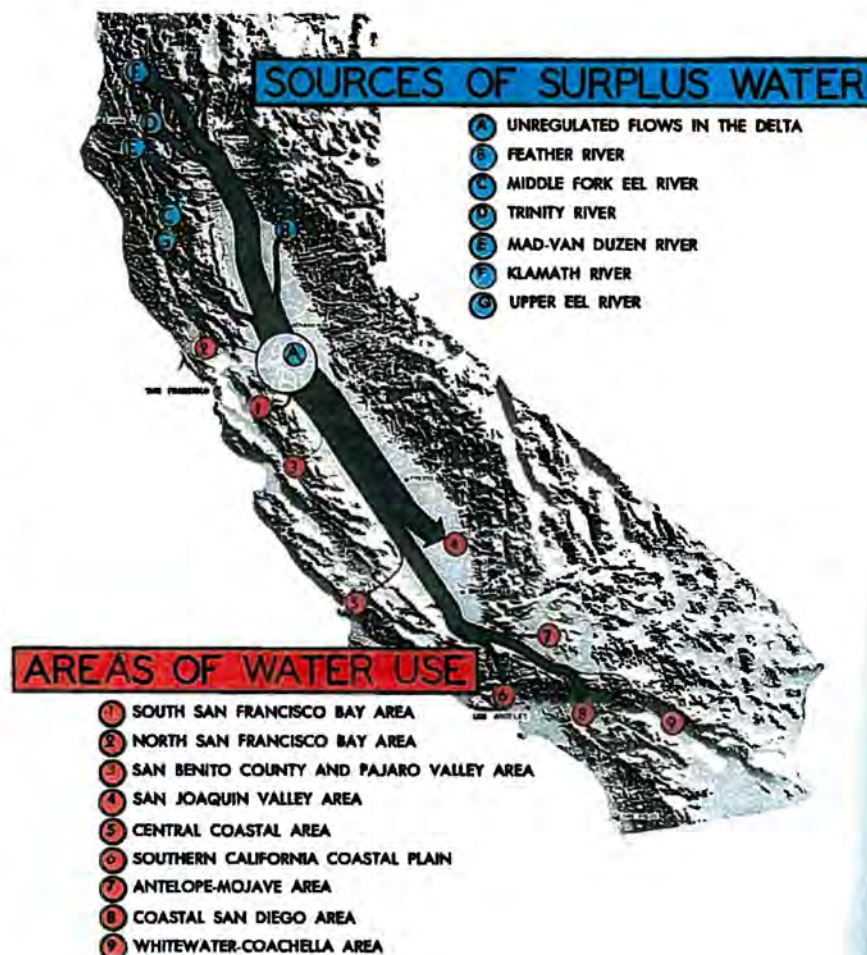
With the growing significance of recreation, the Delta has blossomed into a major recreation area at the doorsteps of metropolitan development in the San Francisco Bay area, Sacramento, and Stockton. In 1960, nearly 2,800,000 recreation-days were enjoyed in this boating wonderland.

The Delta — its role in California's water development

In 1959, the State Legislature enacted the California Water Resources Development Bond Act to finance construction of the State Water Resources Development System. The bond act was approved by the California electorate in November 1960. The State Water Facilities, the initial features of this system, will complement continuing local and federal water development programs and include the very necessary works in the Delta.

One of the principal objectives of the State Water Resources Development System is to conserve water in areas of surplus in the north and to transport water to areas of deficiency to the south and west. The Delta is important in achieving this objective, since it receives all of the surplus flows of Central Valley rivers draining to the ocean during winter and spring months and is the last location where water not needed in the Delta or upstream therefrom can conveniently be controlled and diverted to beneficial use. Surplus water from the northern portion of the Central Valley and north coastal rivers will be conveyed by the natural river system to the Delta, where it must be transferred through Delta channels to export pumping plants without undue loss or deterioration in quality. Aqueducts will convey the water from the Delta to off-stream storage and use in areas of deficiency to the south and west.

In addition to being an important link in the interbasin transfer of water, the Delta is a significant segment of California's economy, and its agricultural, municipal, and industrial water supply problems, and flood control and related problems, must be remedied. A multipurpose system of Delta water facilities, which will comprise one portion of the State Water Resources Development System, is the most economical means of transferring water and solving Delta problems.

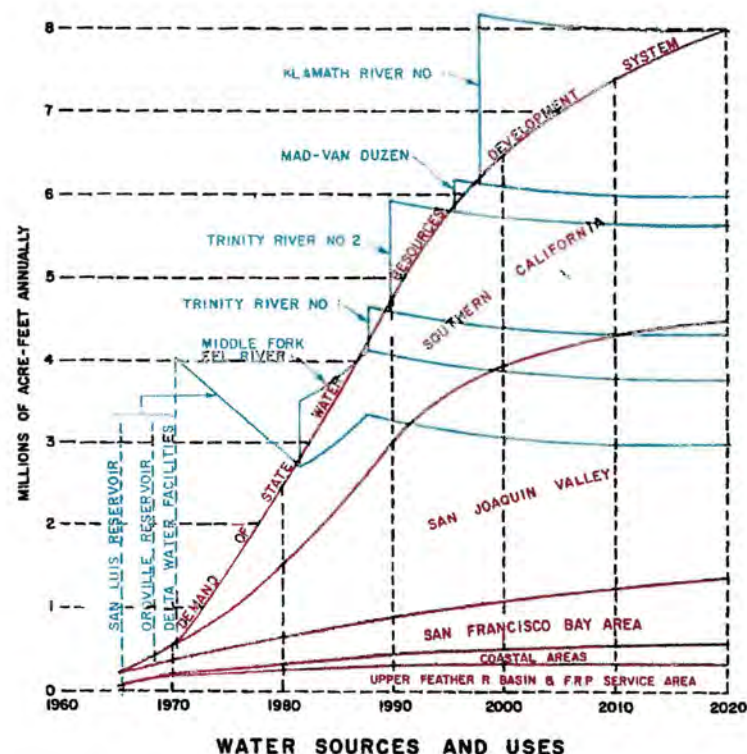


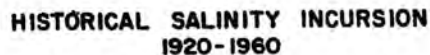


Tracy Pumping Plant

Full demands on the State Water Resources Development system can be met until about 1981 from surplus water in and tributary to the Delta with regulation by the proposed Oroville and San Luis Reservoirs. However, upstream depletions will reduce the available surplus supplies and water will have to be imported from north coastal sources after that year. It is anticipated that coordinated operation of the State Water Resources Development System and the Federal Central Valley Project will afford a limited increase in usable surplus Delta supplies beginning in 1981. As indicated in the chart, upstream depletions will continue to decrease the available surplus supplies.

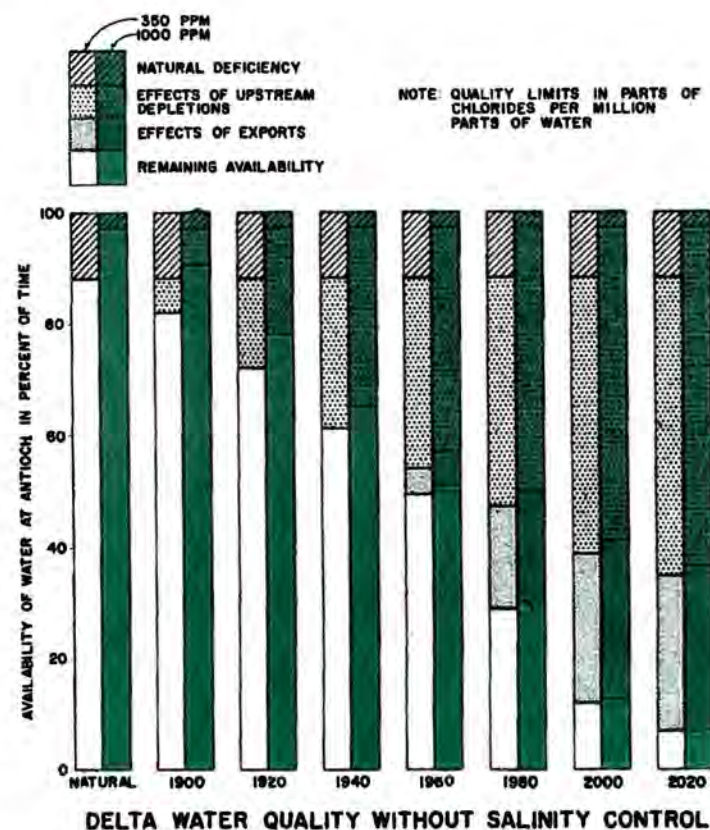
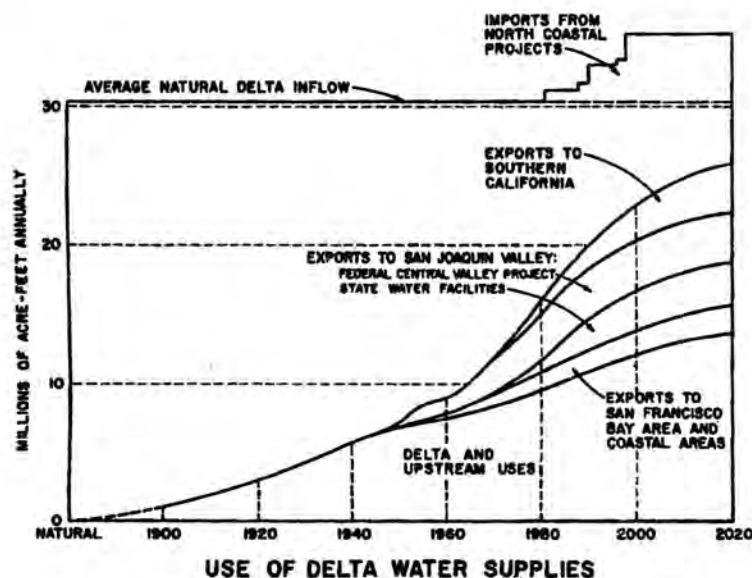
The coordinated use of surplus water in and tributary to the Delta and of regulated or imported supplements to this supply, as required, is referred to as the Delta Pooling Concept. Under this concept of operation the State will ensure a continued supply of water adequate in quantity and quality to meet the needs of export water users. Advantage will be taken of surplus water available in the Delta, and as the demand for water increases and the available surplus supply is reduced by further upstream uses, the State will assume the responsibility of guaranteeing a firm supply of water, which will be accomplished by construction of additional storage facilities and import works. At the same time, the water needs of the Delta will be fully met.





Further increase in water use in areas tributary to the Delta will worsen the salinity incursion problem and complicate the already complex water rights situation. To maintain and expand the economy of the Delta, it will be necessary to provide an adequate supply of good quality water and protect the lands from the effects of salinity incursion. In 1959 the State Legislature directed that water shall not be diverted from the Delta for use elsewhere unless adequate supplies for the Delta are first provided.

The natural availability of good quality water in the Delta is directly related to the amount of surplus water which flows to the ocean. The graph to the right indicates the historic and projected availability of water in the San Joaquin River at Antioch containing less than 350 and 1,000 parts chlorides per million parts water, under long-term average runoff and *without* specific releases for salinity control. It may be noted that even under natural conditions, before any significant upstream water developments, there was a deficiency of water supplies within the specified quality limits. It is anticipated that, without salinity control releases, upstream depletions by the year 2020 will have reduced the availability of water containing less than 1,000 ppm chlorides by about 60 percent, and that exports will have caused an additional 30 percent reduction.



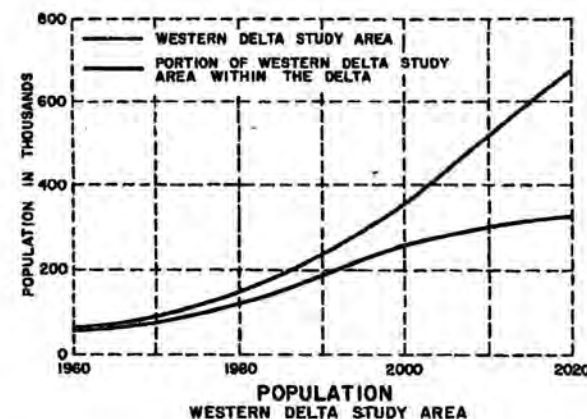
The magnitude of the past and anticipated future uses of water in areas tributary to the Delta, except the Tulare Lake Basin, is indicated in the diagram to the left. It may be noted that, while the present upstream use accounts for reduction of natural inflow to the Delta by almost 25 percent, upstream development during the next 60 years will deplete the inflow by an additional 20 percent. By that date about 22 percent of the natural water supply reaching the Delta will be exported to areas of deficiency by local, state, and federal projects. In addition, economical development of water supplies will necessitate importation of about 5,000,000 acre-feet of water seasonally to the Delta from north coastal streams for transfer to areas of deficiency.

Delta Problems—municipal water

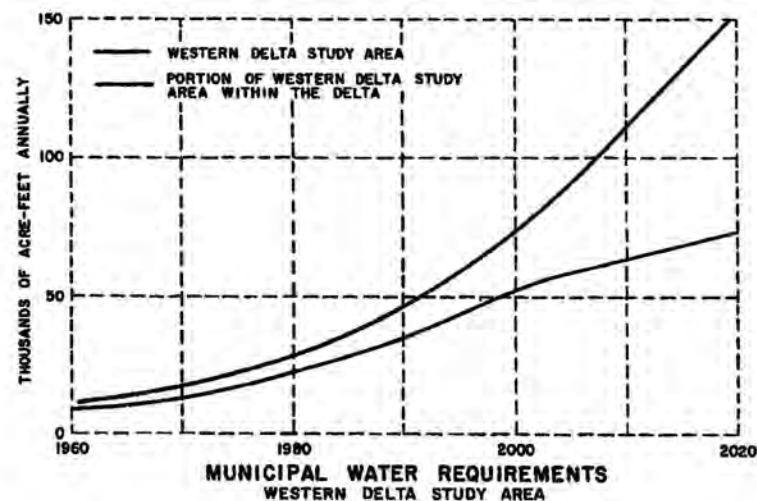
Municipalities in the surrounding upland areas of the Delta, except in the western portion, obtain their water supplies from surface or underground sources which are, or will be with further development, adequate to meet their needs. In the western Delta, the principal municipalities rely on supplies from the Contra Costa Canal which are diverted from Delta channels. The main problem relates to quality of the water. At the present time, the mineral quality of the supplies deteriorates during some summer and fall months below standards established by the U. S. Public Health Service. This results from incursion of ocean salts, combined with industrial wastes and poor quality return water from the Central Valley. Assurance of good quality supplies in adequate quantities to meet present requirements and anticipated future growth is one of the most pressing problems in the Delta.

Estimates of future municipal water requirements in the western Delta area were based on projected population and per capita use. Population projections were founded on national, state, and regional forecasts for moderately high economical conditions. Although these conditions result in forecasts which may exceed an anticipated "most probable" projection by about ten percent, it is believed that this approach will assure adequate consideration of Delta water requirements in plans for diversion of surplus water from the Delta.

Projected estimates of per capita water uses reflect anticipated increases due to greater emphasis on water-using appliances in homes, additional lawns and landscaping, and the general trend toward higher standards of living. An average municipal water use of about 140 gallons per capita per day at this time reflects the climatic and economic conditions of the area. It is anticipated that the average use in low density residential areas will increase to about 200 gallons per capita per day by 2020. The estimated total annual municipal water requirement in the western Delta area indicates about a fifteenfold increase by 2020.



ESTIMATED MUNICIPAL WATER REQUIREMENTS WESTERN DELTA STUDY AREA (In thousands of acre-feet annually)				
Area	1960	1980	2000	2020
Western Delta Study Area				
Contra Costa Co.	9.6	26.8	62.7	116.4
Solano Co.	0.7	1.4	10.0	35.4
Portion of Western Delta Study Area Within the Delta				
Contra Costa Co.	8.6	22.6	52.0	71.4
Solano Co.	0.0	0.0	0.4	2.5

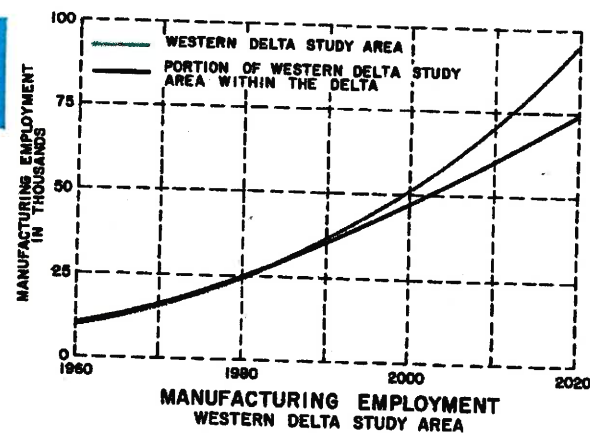


Delta Problems—industrial water

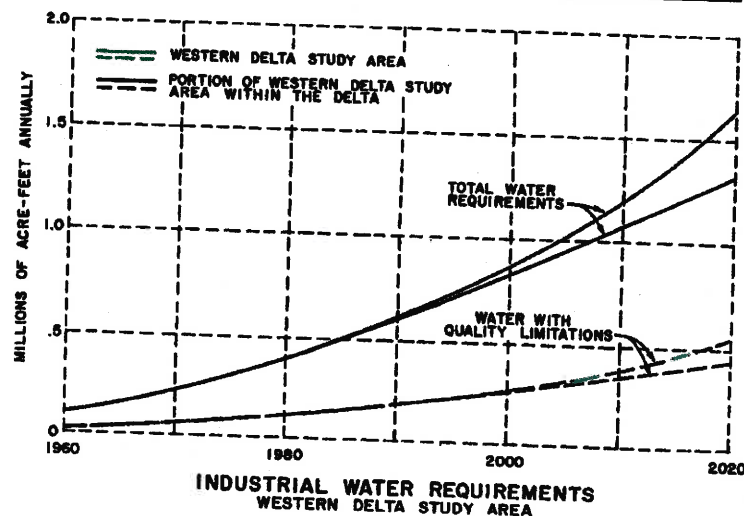
The problems of industrial water supply are similar to municipal supply problems in that they are concentrated in the western Delta area and center around quality aspects. Deterioration of water supplies by salinity incursion in 1959 caused curtailment of production in several plants and a production halt in one major industry. As additional upstream development and beneficial use of water takes place, the duration and degree of salinity incursion each year will become more extended. It will become increasingly necessary to provide adequate industrial water supplies in the western Delta area for maintenance and expansion of the present economy.

Estimates of future industrial growth were based on correlation of state and regional manufacturing employment with national projections. Projections to 1980 were based on detailed analyses of the several components of the industrial complex, while projections beyond that date reflect total manufacturing employment. A sevenfold increase in manufacturing employment in the western Delta area is anticipated by 2020. Increasing productivity per employee, due to automation and technical advancements, coupled with projected employment, indicates a thirtyfold increase in production by that date.

Estimates of future water supplies to enable the production increases were based on six manufacturing categories, and reflect a continuation of the trend of decreasing water use per unit of production. A fifteenfold increase in total industrial water requirements is indicated by 2020. The total requirement includes two types of industrial water. One type is for processing and recirculated cooling with quality limitations, and the second type is for general cooling where good quality water is not required because materials of construction in cooling equipment can satisfactorily withstand a wide range of quality conditions.



ESTIMATED INDUSTRIAL WATER REQUIREMENTS WESTERN DELTA STUDY AREA (in thousands of acre-feet annually)				
Area	1960	1980	2000	2020
Western Delta Study Area				
Total water requirements, Contra Costa Co.	106	396	790	1,270
Total water requirements, Solano Co.	1	7	67	387
Water with quality limitations, Contra Costa Co.	30	120	251	423
Water with quality limitations, Solano Co.	-	2	21	129
Portion of Western Delta Study Area Within the Delta				
Total water requirements, Contra Costa Co.	106	396	790	1,270
Total water requirements, Solano Co.	-	-	9	56
Water with quality limitations, Contra Costa Co.	30	120	251	423
Water with quality limitations, Solano Co.	-	-	3	19

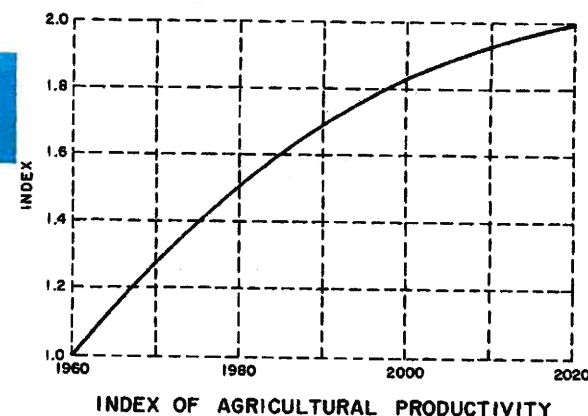


Delta Problems—agricultural water

For many years farmers in the Delta have been confronted with salinity incursion in Delta channels. Since 1944 they have enjoyed partial salinity protection and supplemental water due to releases from Shasta and Folsom Reservoirs. As additional water is utilized in areas tributary to the Delta, there will be further reductions in unregulated late spring runoff to the Delta, which will result in diminishing supplies in the western Delta and greater Delta-wide reliance on regulated fresh water outflow. About 40,000 acres in the western Delta are faced with water supplies of poor quality even if future export projects are not constructed. In the southern portion of the Delta the present water supplies during summer months consist mainly of very poor quality drainage water in the San Joaquin River. Operation of the proposed San Joaquin Valley waste conduit may reduce the amount of return drainage water available in the San Joaquin River. If this occurs, substitute water supplies would have to be provided.

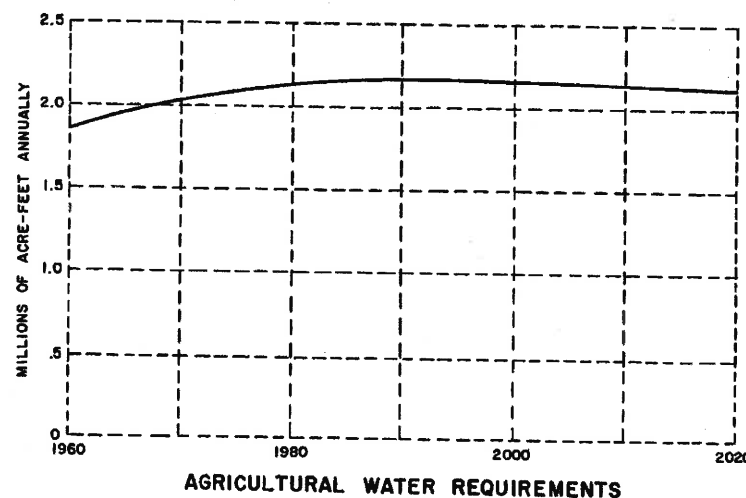
Although most of the suitable land in the Delta is now irrigated, limited additional development in the uplands is anticipated, and more intense use by double-cropping will be made of Delta lowlands. Estimates of expanding water requirements reflect correlations with statewide projections of the economic demand for farm produce. It is anticipated that about 10,000 acres of "new" land will be irrigated in the upland areas, but about 40,000 acres will be converted to urban uses by 2020.

Future water requirements were based on projected crop patterns and unit water requirements of the various crops. Some additional water may be required for leaching of lands surrounded by brackish water. Separate allowance for this purpose was provided in operation studies of plans which result in brackish water in western Delta channels.



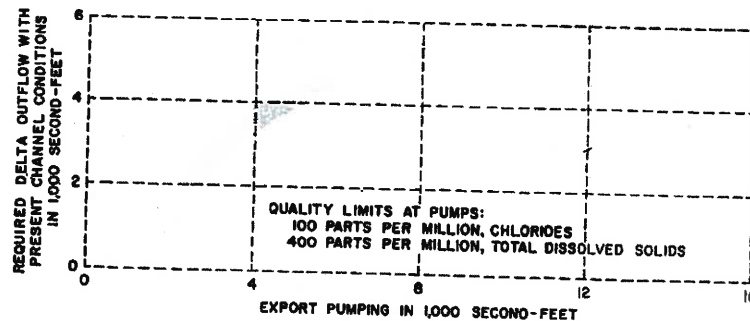
ESTIMATED AGRICULTURAL WATER REQUIREMENTS WITHIN THE DELTA ¹				
(In thousands of acre-feet annually)				
Area	1960	1980	2000	2020
Alameda County.....	13	15	15	15
Contra Costa County.....	236	272	275	270
Sacramento County.....	294	339	342	336
San Joaquin County.....	838	967	977	958
Solano County.....	238	264	267	261
Yolo County.....	244	282	285	279
TOTAL	1,863	2,139	2,161	2,119

¹ Including effective precipitation.

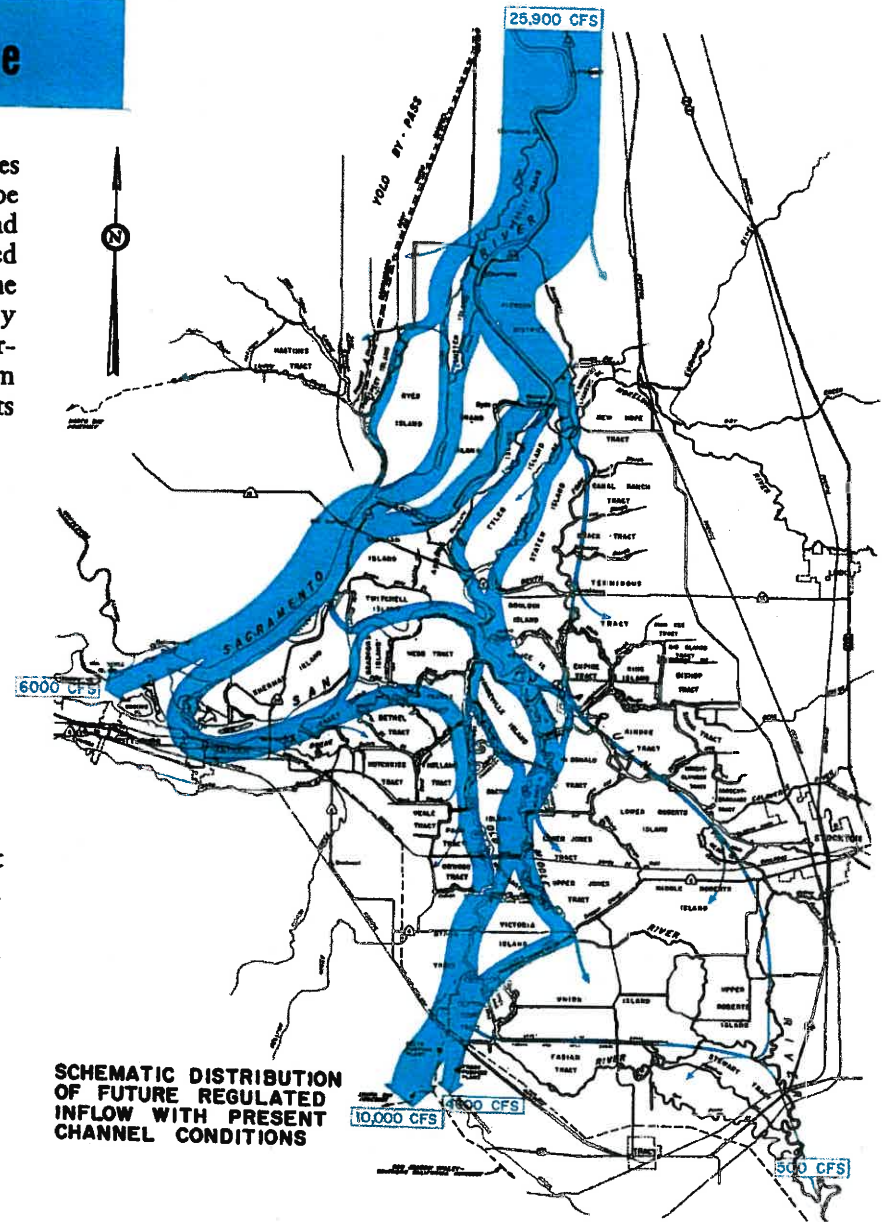


Delta Problems—water salvage

During winter months of most years, flood flows exceed Delta uses and flush ocean salts from the channel system. Surplus water can be diverted from the Delta under these conditions. During summer and early fall months, the inflow to the Delta is generally limited to regulated flow in the Sacramento River. This supply must meet all uses in the Delta and export therefrom, and prevent salinity incursion from unduly degrading the quality of water in the Delta. Due to the hydraulic characteristics of the complex channel system, the amount of outflow from the Delta necessary for quality control at the export pumping plants increases as the rates of export increase.

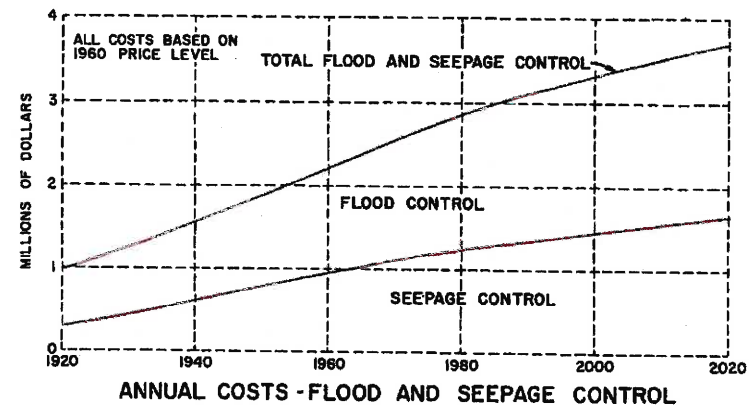
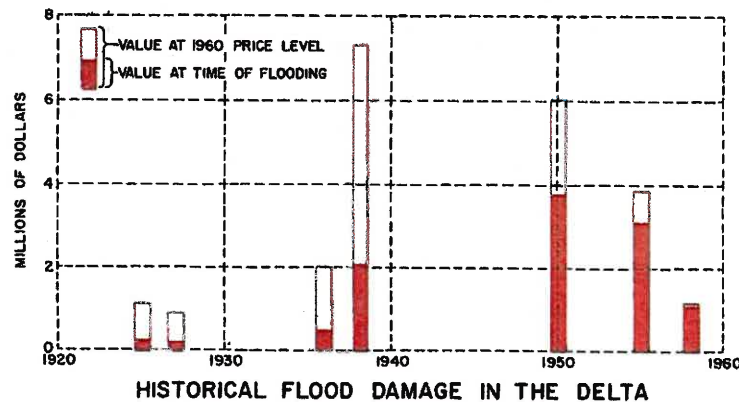


Water in the Sacramento River follows two basic routes to the export pumping plants. It flows from the vicinity of Walnut Grove through several generally parallel channels in a southerly direction across the central portion of the Delta, and also through channels in the western portion around Sherman Island and then upstream into the central area. The quantities transferred by the first route are *not sufficient* to supply the pumps and enroute Delta users during summer months, and water transferred around Sherman Island by the second route is mixed with and carries ocean salts into the Delta. Therefore, greater quantities of water will be necessary to reduce the salinity concentrations in the western Delta, unless a physical barrier is constructed or water is diverted directly southward across the Delta.



SCHEMATIC DISTRIBUTION OF FUTURE REGULATED INFLOW WITH PRESENT CHANNEL CONDITIONS

Delta Problems—flood and seepage control

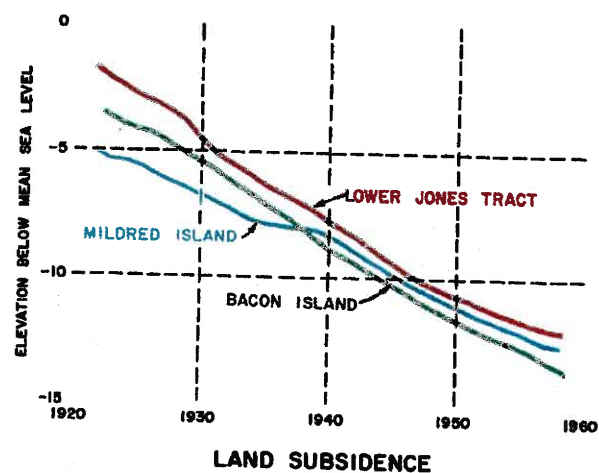


While the peat soils of the Delta are excellent for growing crops, they cause several difficult levee maintenance and farming problems. Levees along the channels have been constructed on the peat and periodically must be raised and widened as the organic foundation soils are consolidated. During the early stages of land reclamation, islands were frequently flooded by overtopping of the levees. However, under present conditions floods due to overtopping are infrequent in the central portion of the Delta, but numerous islands have been flooded when sections of the levees have suddenly failed. This apparent trend toward decreasing levee stability results from subsidence of the land surface and resultant greater forces on the levees. Despite increasing maintenance work on many existing levees, no significant improvement in protection is achieved.

The land surface in areas of peat soils is subsiding at an average rate of about three inches per year. This is generally attributed to

oxidation of the peat fibers, wind erosion, compaction by farm equipment, and loss of water in the upper few feet. As a result of land subsidence, future levees in many areas will be 30 to 35 feet high. Work must be initiated soon to gradually increase the stability of the levees for these future conditions. In this connection, it must be recognized that flood protection for the Delta must include works in the Delta. Flood stages in the Delta result from inflow and high tides, frequently amplified by heavy winds on the ocean and Bay system. Although upstream flood control reservoirs will afford some relief, more stable levees are needed to safely resist the high tide and flood stages.

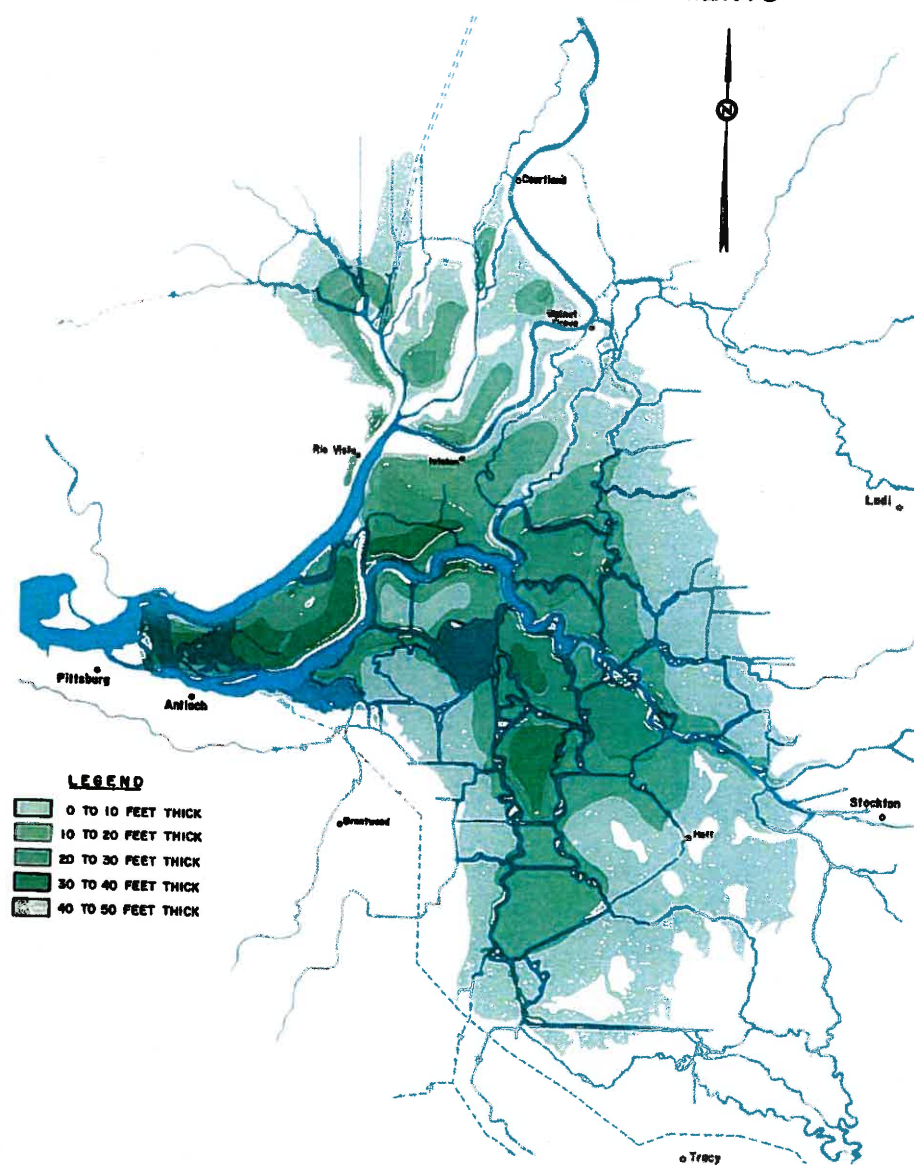
As the peat soils are lost by oxidation and erosion, the seepage problems are compounded. Differences in elevation between water levels in the channels and in the islands will increase, and the resistance by the peat to upward movement of water from



underlying sand aquifers will be reduced. Unless suitable methods of arresting the loss of peat are developed, farming in the Delta will cause continued subsidence. Experience has shown that this subsidence will continue to within about two to three feet above the bottom of the peat. Significant tracts of Delta land will become impractical to farm unless seepage is controlled and the danger of inundation is reduced.

The largest natural gas field in areal extent in the State of California is located in the Delta. The geological structure of this field is strikingly similar to the structure of the oil fields of Wilmington, California, but the gas pressures are dissimilar. Because of the similarity of geologic conditions, studies are being conducted to determine if deep-seated subsidence might occur as the gas is extracted. Estimates based on preliminary data indicate a maximum subsidence of two feet in the Rio Vista area, if all the gas is extracted from the field.

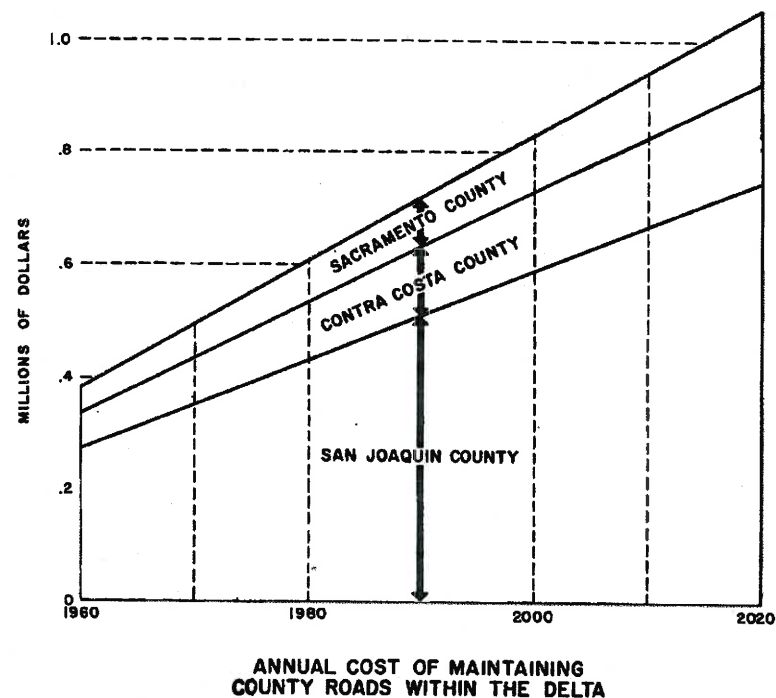
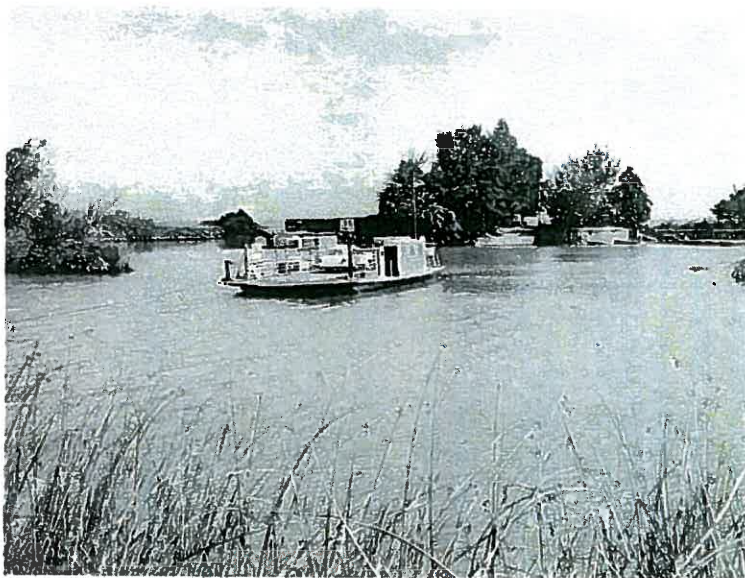
AREAS OF PEAT AND RELATED ORGANIC SEDIMENTS



Delta Problems—vehicular transportation

The wooden barges and stern paddle wheelers long ago disappeared from the Delta scene, to be replaced by fast trucks, ocean-going freighters, and tugs towing steel barges. However, despite tremendous technological advances in transportation, the Delta, with its poor foundation soils and miles of open waterways, has hindered the development of a satisfactory highway system.

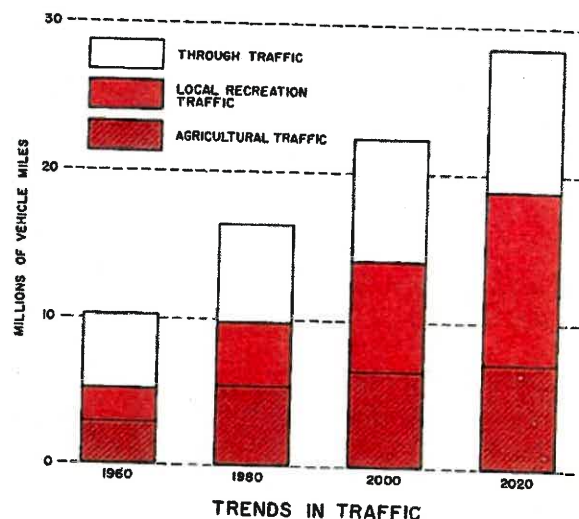
Vehicular transportation, even today, is confined mainly to the crowns of the levees which encircle the farmlands, and inter-island traffic is dependent to a large extent on ferries. Periodic levee reconstruction to compensate for consolidation and land subsidence results in delays and detours for the traveling public and farm-to-market com-



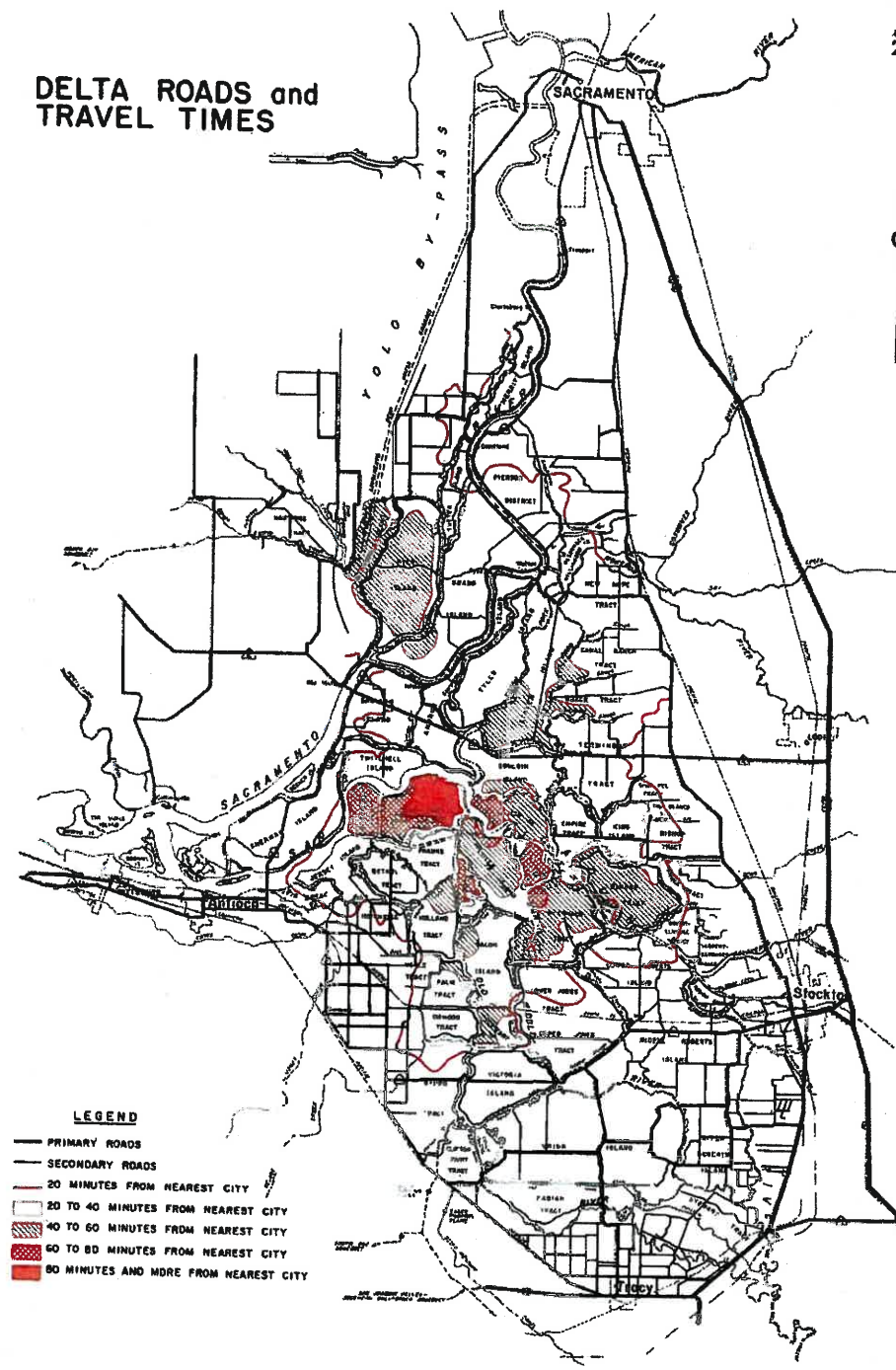
merce. In winter months much of the area is inaccessible because of muddy roads. There are 950 miles of paved roads in the area, but because of the unstable peat foundation, the costs of maintenance and operation are disproportionately high. For example, in San Joaquin County only 12 percent of the county's 1,780 miles of roads is in the Delta, but almost 30 percent of the county's annual costs of \$1,000,000 for highway facilities is expended in the Delta. Future costs will increase due to greater use of the road system.

While it is true that today's Delta roads are greatly improved over those of the past, there still remains a serious lack of access to many remote locations of the Delta. Improvements are also needed in roads linked with the state and county highway networks. Travel times to principal cities of Stockton, Tracy, Sacramento, and Antioch are depicted on the map.

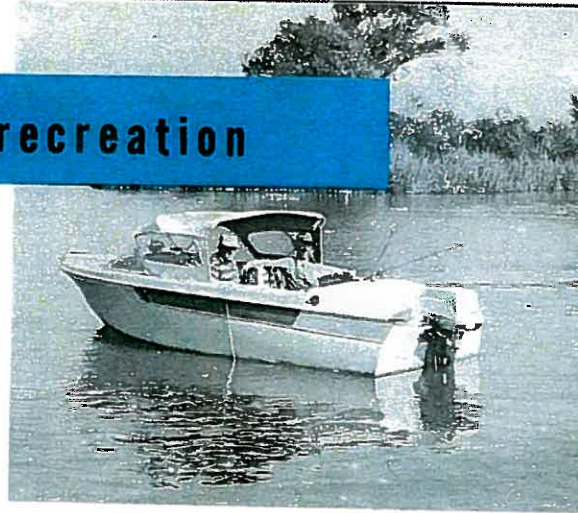
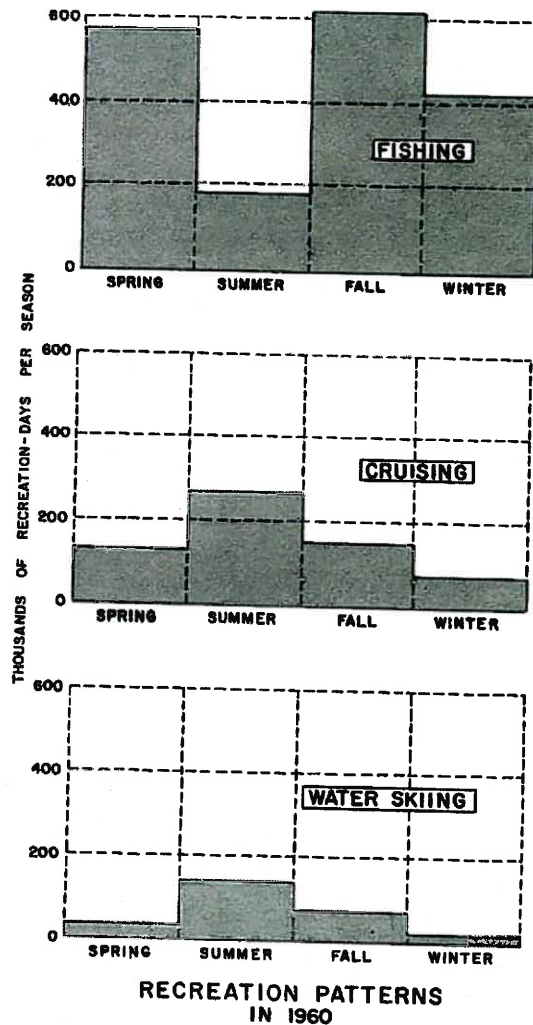
An expanded and improved system of roads would unquestionably make the Delta more attractive to the recreation industry. The new roadways also would benefit many local landowners who are presently at an economic disadvantage in shipment of their crops to markets. Increasing production in the Delta, due to anticipated double-cropping and improvements in farming practices, will increase the amount of agricultural road traffic.



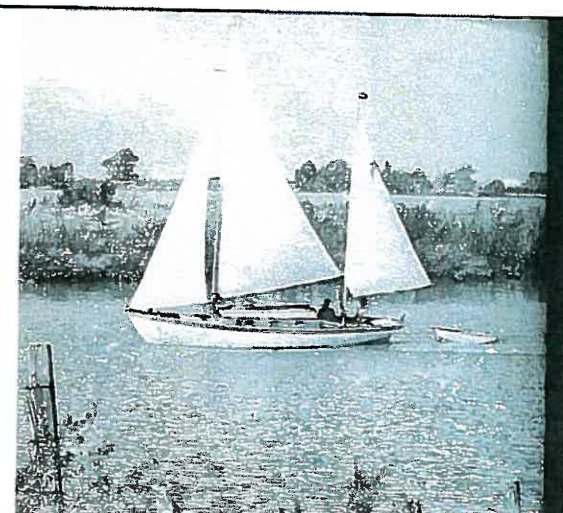
DELTA ROADS and TRAVEL TIMES



Delta Problems—recreation



Courtesy of Los Angeles Times



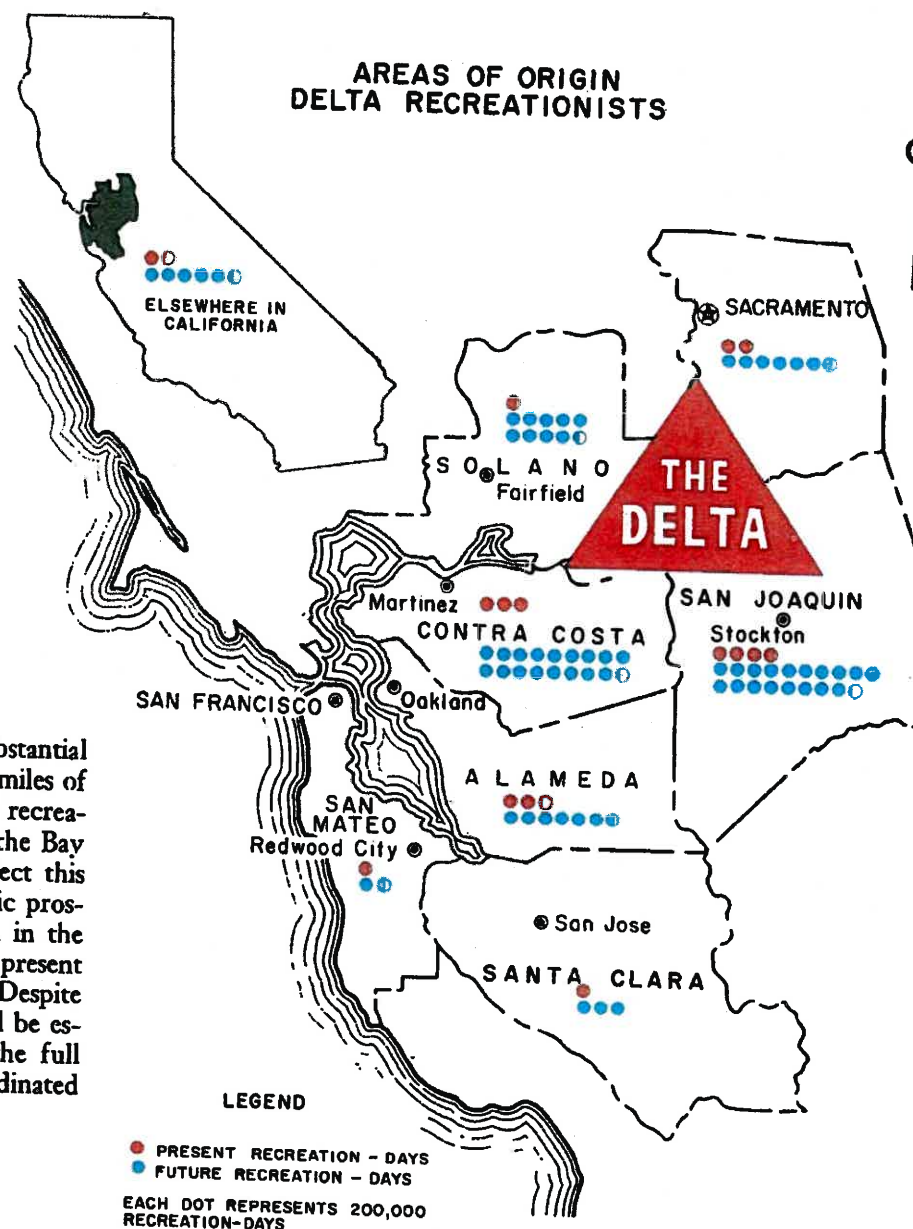
Courtesy of Los Angeles Times

The 50,000 acres of water surface and almost 1,000 miles of shore line in the Delta offer a vast and fascinating area with a great diversity of recreational opportunities. Fishing is the favorite pursuit and striped bass is the leading catch. Salmon, shad, black bass, catfish, and sturgeon are also important in the sportsman's bag. The maze of Delta channels is appealing to boatmen for cruising, and the many miles of calm water are ideal for water skiing and high-speed boating. While many of the channels are not extensively used, due mainly to difficulty of access and lack of service facilities, other areas have become congested and competition is developing between fishermen, boatmen, and skiers. Safety of the recreationists is becoming a significant problem and local law enforcement agencies are increasing their patrols. Levee erosion problems due to speeding boats also have developed in some localities. Picnicking and swimming are becoming more attractive as facilities are developed, and duck and pheasant hunting is very popular. There are now 123 private and public resorts which cater primarily to fishermen and boatmen in the Delta. In addition, many of these resorts are also developing facilities for picnicking and camping.



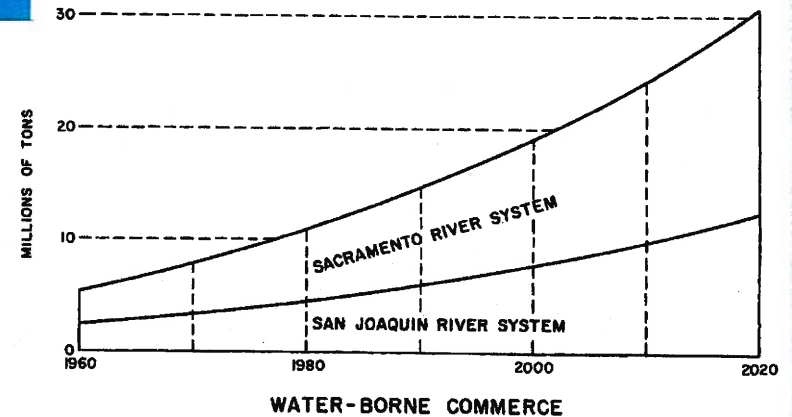
Courtesy of Hubert Miller

Although the Delta at the present time is a scene of substantial recreation use, there is ample room for expansion. Many miles of shore line and large areas of water are still available for recreational development. As the rapid population growth of the Bay area continues, recreation activity in the Delta will reflect this increase. Based on a future of continued general economic prosperity and population growth, the amount of recreation in the Delta will increase from 2,800,000 recreation-days at the present time to as many as 14,000,000 recreation-days by 2020. Despite the size of the Delta, proper local zoning and control will be essential for public safety and continued enjoyment. If the full recreation potential of the region is to be realized, coordinated planning by state and local agencies will be required.



Delta Problems—navigation

The Delta channels are extensively utilized by vessels ranging in size from rowboats to deep-draft commercial freighters and warships. The significance of navigation in the Delta has risen and fallen in the past, but in the last few decades it has been steadily increasing. The Corps of Engineers maintains many miles of channels in authorized navigation projects, the principal one in recent years being the Stockton Deep Water Channel. Construction is now underway on the Sacramento Deep Water Channel. Petroleum products carried by tugs and barges account for the majority of commercial shipping, but large amounts of farm produce are shipped by barges and deep-draft freighters.



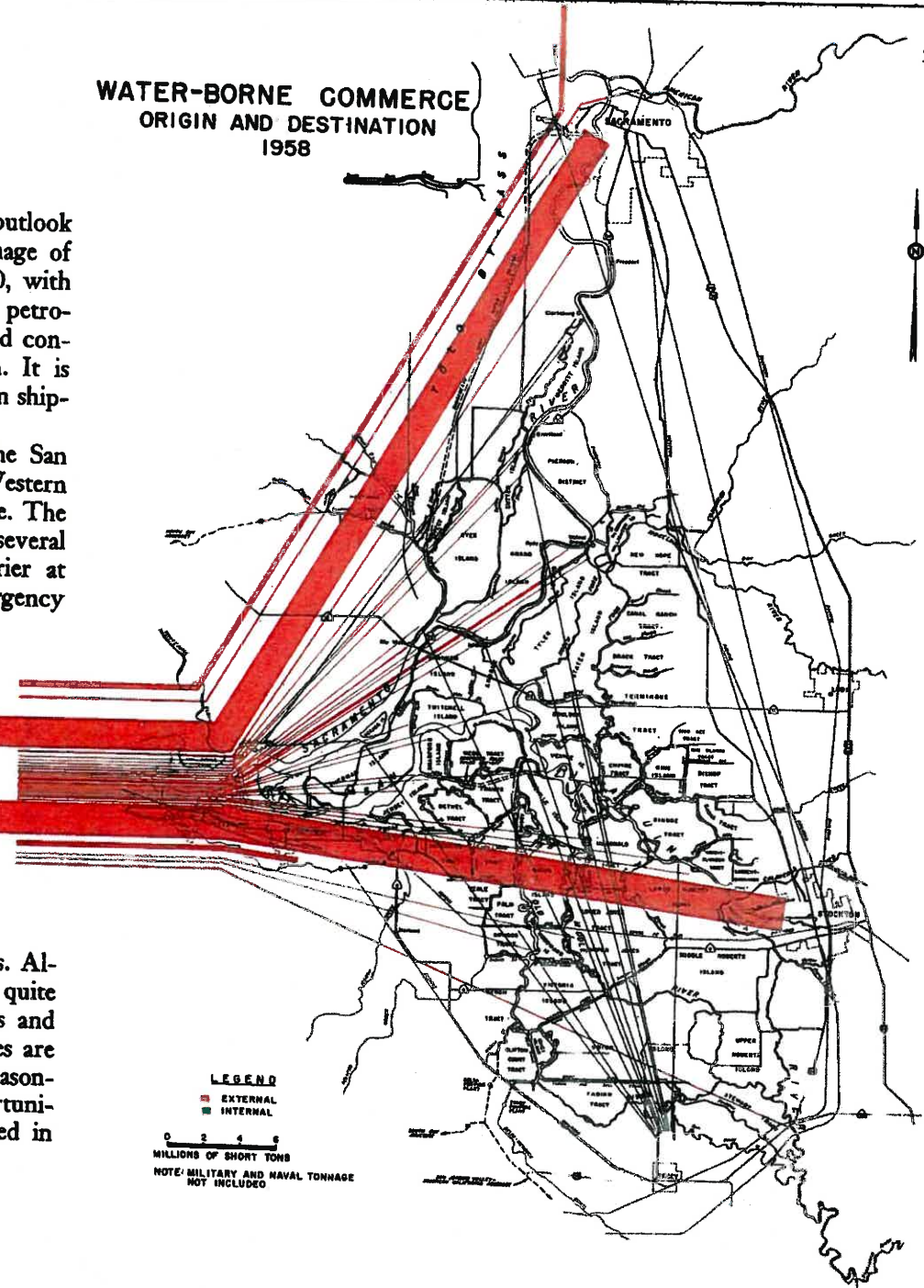
Courtesy of Robert Yelland

**WATER-BORNE COMMERCE
ORIGIN AND DESTINATION
1958**

Projections of future commerce indicate an optimistic outlook for shipping in the Delta. It is anticipated that the tonnage of commercial shipping will increase about fivefold by 2020, with petroleum being the principal commodity. Projections of petroleum shipments were related to population projections and continuation of the trend toward more vehicles per capita. It is anticipated that the present relationship between petroleum shipments by water and by other means will continue.

In 1955 in conjunction with studies of barriers in the San Francisco Bay system, an opinion was requested of the Western Area Joint Panel on effects of barriers on national defense. The panel, which was composed of representatives of the several branches of the military service, concluded that a barrier at Chipps Island would be permissible, if it contained an emergency access for navigation.

The Delta channels are widely used for recreation boats. Although some areas are relatively unused, other areas become quite congested. Conflicting interests arise between water skiers and cruising parties and the fishermen. In some locations levees are subjected to severe erosion by boat-generated waves. All reasonable measures must be undertaken to preserve boating opportunities, and facilities to enhance recreation can be constructed in certain locations.



Planning and Design Concepts

Planning for solutions to the complex Delta problems necessitates full recognition of the interrelated effects on all phases of the Delta's economy. The best solution should reflect the greatest overall benefits and least detriments, realizing that both objectives cannot be completely achieved when basic interests differ. Economies of construction and operation generally may be effected by multi-use of facilities. Therefore, consideration must be given to multi-purpose development.

DELTA WATER SUPPLY

*Water users in the Delta enjoy a naturally convenient source of supply in the numerous channels from which water is diverted by siphon or low-lift pumps. The supply problem in portions of the Delta stems from the poor quality of water, due to salinity incursion from the Bay and degradation by agricultural and industrial wastes. Adequate water supplies could be provided either by regulated releases of stored fresh water to repel salinity incursion and flush other wastes, or by constructing a physical barrier against salinity incursion and conveying unusable wastes beyond the barrier. A third alternative would involve a reduction of present salinity control in the western Delta channels

and provision of substitute fresh water supplies to users who could not then divert from the channels containing brackish water. All three alternatives were evaluated, with particular attention to minimizing modifications to existing water supply systems.

The California Water Code specifies that one of the functions of the State Water Resources Development System is to provide salinity control and an adequate water supply in the Delta. If it is in the public interest to provide substitute supplies in lieu of salinity control, no added financial burden shall be placed on the local water users as a result of such substitution. The code also declares that water to which the Delta is entitled shall not be diverted. It is clearly established that supplying water for the Delta must be a primary and integral function of the State Water Facilities.

WATER SALVAGE

Unless physical works are constructed in the Delta, increasingly greater quantities of outflow will be required for quality control as more and more water is transferred across the Delta. However, most of the required outflow could be salvaged by constructing a physical barrier against salinity incursion, or by transferring the water more

directly across the Delta to prevent commingling with brackish water near the outlet of the Delta.

The quality of water available for export, as well as for use in the Delta, must be suitable for various purposes. Standards for mineral quality, adopted by the Department of Water Resources and incorporated in water service contracts, permit not more than 400 parts of total dissolved solids and 100 parts of chlorides per million parts of water.

FLOOD AND SEEPAGE CONTROL

Flood stages in the Delta result from a combination of high tides, amplified by heavy winds on the ocean and Bay system, and inflow to the Delta. Historic inundations have generally resulted from levee failures, rather than overtopping. As the land behind the levees continues to subside, the stability of the levees decreases.

Physical and economic factors dictate an extended construction period for improvement of levees on organic soils. To reduce the extent and cost of levee improvements, it is prudent to limit flood waters to principal improved flood channels. Additional flood control reservoirs on rivers entering the Delta are contemplated for construction in the near future. Therefore, it is economical to design Delta flood channels for rates of flow anticipated after construction of upstream storage. Design of improved flood channels was predicated on additional

regulation of the Cosumnes, Mokelumne, Calaveras, Stanislaus, and Tuolumne Rivers. Although the "design" floods reaching the Delta after completion of these works may generally be expected to occur on an average of once every fifty years, the degree of frequency is not particularly meaningful in the tidal channels of the Delta, since protection is largely dependent on levee stability. It should be recognized that complete flood protection generally cannot be assured by construction of control works. Continued emphasis should be placed on flood plain zoning in the Delta for low value improvement uses as generally associated with farming.

Construction of principal flood channels and creation of interior channels would afford an opportunity to regulate water stages in the interior channels. Since the rate of seepage inflow to the islands is directly related to the level of water in the surrounding channels, seepage could be reduced by lowering the water levels.

However, project operation might cause increased seepage problems in certain locations. Where these problems are evidenced by future operation, remedial measures would be necessary. Allowances for cost of such works were included in planning for areas of anticipated damage.

VEHICULAR TRANSPORTATION

Improvements in the road network of the Delta to enhance recreational opportunities and reduce costs of farm-to-market

travel, could conveniently and economically be incorporated in master levee construction for flood and seepage control. Construction of the master levees would involve a wide berm on the landward side of existing levees in most locations. This berm would provide a suitable base for a road. Parking areas off the roadway could also be constructed at many locations. Channel closures in the master levee system would eliminate the need for ferries in certain locations.

Where existing roads would be rendered unusable by construction and operation of the Delta water facilities, equivalent service would be provided. Road improvements which would enhance the existing system, such as better road surfacing or extensions to connect with nearby routes, could be incorporated, if local agencies desire these improvements and participate in the costs.

RECREATION

The Delta is extensively used for recreation at this time, yet its potential use is several times greater. Planning for any facilities in the Delta should seek to minimize adverse effects on recreation, consistent with sound economics, and to enhance the attractiveness and advantages of the Delta for further recreational development. It is recognized that flood and seepage control measures, or other works which restrict free movement of boats, tend to limit recreation activity. While such effects could be reduced by providing small craft locks and

portage facilities, some inconvenience would remain. Where such conflicts occur, local choice will be necessary between flood and seepage control works or open channels for recreation. Additional recreation facilities and joint use of certain lands for recreation and other purposes should be planned to enhance the potential recreational development. Local desires, as evidenced by questionnaires and discussions with county recreation agencies, guided planning for recreation facilities.

NAVIGATION

Principal ship channels in the Delta serve deep-draft commercial and military shipping. Shallow-draft tug and barge traffic utilizes the ship channels and many other channels in the Delta. The effects of alternative plans on commercial navigation can be readily evaluated, and the nature and extent of compensating measures or benefits can be determined. Unfortunately, it is not possible to evaluate in comparable terms the effects of war-damaged facilities on national defense. However, comparisons of alternative plans must include recognition of national defense aspects.

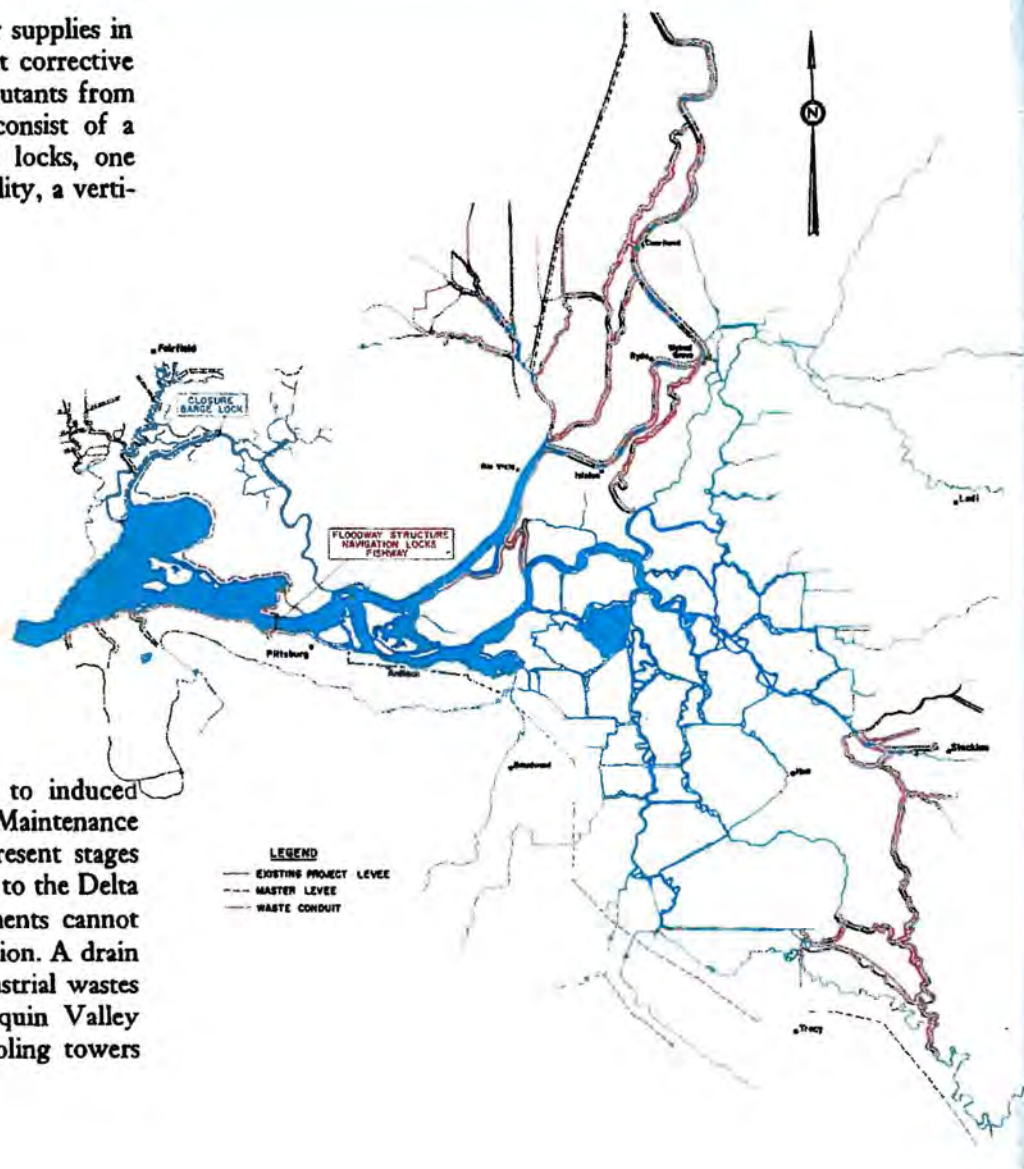
FISH

The Delta is a dominant factor in the habitat of several anadromous species of fish and the residence of several additional sport fish. All reasonable measures must be taken to minimize the adverse effects of planned facilities on the fisheries in the Delta and, when possible, to provide for their enhancement.

Chippis Island Barrier Project—physical works

A barrier at Chippis Island would insure the water supplies in the Delta against salinity incursion from the Bay, but corrective features would be necessary to dispose of other pollutants from sources upstream. The principal structure would consist of a gated floodway section, two deep-draft navigation locks, one barge lock, one small craft lock, a tug assistance facility, a vertical baffle fishway, emergency navigation access, and appurtenant operating facilities. The floodway section would have a net area of openings equivalent to the existing channel in order to preclude interference with flood flows. The conventional navigation locks would allow a limited amount of denser saline water to enter the upstream pool, but this water would be removed from a sump by a salt-scavenging system of pipes and pumps. A barge lock would be located on Montezuma Slough near the new Grizzly Island bridge, about ten miles north of Chippis Island.

A barrier at the Chippis Island site would require a master levee system along principal channels in Suisun Bay to contain the high tidal stages, which would be higher than the present high stages. Additional dredging of navigation channels also would be necessary, due to induced lower low tidal stages downstream from the barrier. Maintenance of water levels in Delta channels at lower than present stages during summer months would require improvements to the Delta levees, but the nature and extent of the improvements cannot be accurately evaluated without the project in operation. A drain would be constructed to convey municipal and industrial wastes and agricultural drainage water from the San Joaquin Valley into tidal water downstream from the barrier. Cooling towers



Chippis Island Barrier Project — operation

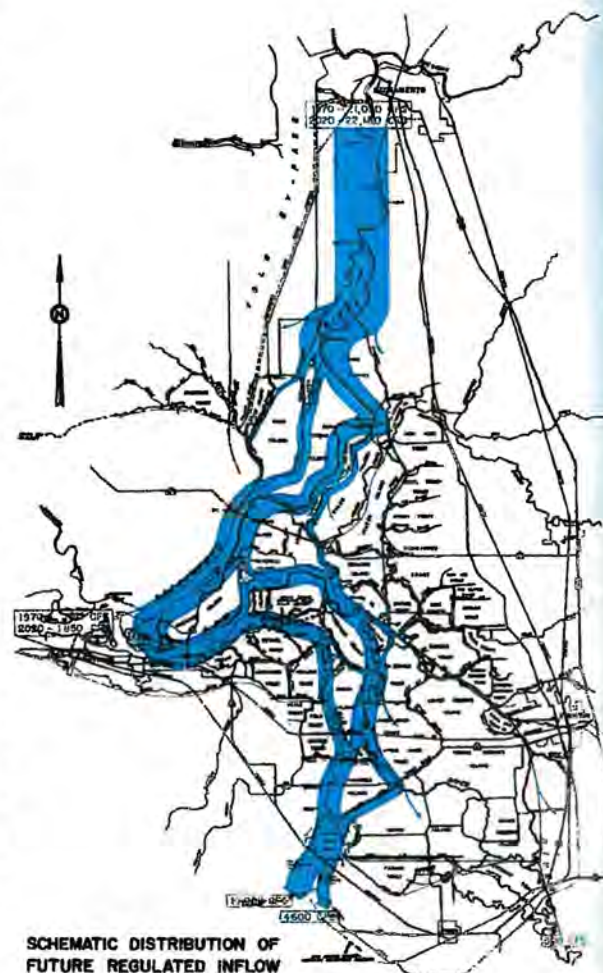
A barrier at Chippis Island would provide a definite separation between saline water in the Bay system and fresh water in the Delta channels, thereby preventing salinity incursion and assuring adequate water supplies in the Delta. However, there would be attendant operating problems, and the barrier and appurtenances would not provide flood control and related benefits to the Delta.

With the floodway gates closed, the inflow to the Delta to supply local uses and export pumping plants would be distributed in the channels as shown in the schematic diagram. Large quantities of water would be directed through channels in the western Delta to remove heat wastes and maintain satisfactory water quality conditions. Storage in the channels could be utilized to achieve a limited amount of regulation. However, navigation requirements would prevent controlling the water level lower than one foot below mean sea level, without additional dredging. Seepage and levee stability problems would limit the maximum level for sustained storage to about two feet above mean sea level. Economic analyses of various operating ranges indicate that a three-foot range in water levels for conservation of flood water would be most economical.

Electric analog model studies reveal that the barrier would increase the tidal ampli-

tudes downstream from the structure. An unusually large amplitude of 6.3 feet at Chippis Island under present conditions would be increased to about 12 feet by a barrier. Changes indicated on the electric analog model were generally confirmed by preliminary tests by the U. S. Corps of Engineers on a hydraulic model which indicated slightly smaller increases in tidal amplitudes and a slight decrease in the mean tide level. The lower low water would seriously affect navigation depths, and the higher high water would seriously affect levees along the downstream bays and municipal, industrial, and military installations along the shore lines. Remedial measures would be necessary.

Disposal of cooling water from power plants and other industries would cause an increase in temperature in the nearly quiescent barrier pool. This increase in temperature would reduce the efficiency of cooling equipment and adversely affect fish, and could cause significantly increased corrosion in equipment exposed to the warmer water. The monetary magnitude of these effects would be dependent upon the amount of heat energy dissipated in the pool by existing and future industries, and many other factors which cannot be fully evaluated at this time. Satisfactory conditions could probably be achieved by passing cool-



ing water from the principal power plants over cooling towers.

To maintain satisfactory water quality conditions in the barrier pool, it would be necessary to convey industrial and municipal wastes to tidal water. Drainage water from the San Joaquin Valley would also have to be discharged into tidal water.

Saline water entering the pool through the locks would be allowed to settle in a sump from which it would be pumped by a salt-scavenging system. Operation of locks would cause delays of about 35 minutes per transit for deep-draft vessels and 20 minutes for tugs and smaller vessels. Assistance would have to be provided to maneuver deep-draft ships through the locks. A tug and operating crew for this purpose would be necessary at all times.

National defense aspects dictate that an emergency navigation access be incorporated in the barrier. This access would consist of concrete bins filled with sand in a section of the barrier. In an emergency, the sand would be pumped out and the bins towed out of the channel.

Anadromous fish would be passed through a vertical baffle fishway, comprising a series of baffles with vertical slots extending to the bottom to provide passages for water and fish. The baffles would dissi-

pate the energy of the water and create a series of bays with a slightly lower water level in each adjacent downstream bay. The bays would provide resting areas for the fish after passing through short distances of high velocity water in the slots. During high tides downstream from the barrier, the fishway would be closed by a gate to prevent saline water from entering the pool.

During flood conditions the gates in the barrier floodway would be opened. Flood stages in the Delta would be essentially the same as under present conditions for comparable flood flows. Since master levees in the Delta are not incorporated in this plan, high flood water would occur in all the channels. Although the flood stages would not be changed, levee stability problems would increase. Tidal fluctuations presently keep the levees saturated a few feet above the mean tide elevation, but under barrier conditions the peat levees would dry out and crack when water levels would be drawn down to about one foot below sea level. Should a sudden flood occur the open barrier gates would permit tidal fluctuations throughout the Delta and sections of some dried-out levees might become unstable and fail as the water levels rapidly rise and fall. Remedial work would be required as problems develop. Allowances for cost of this as yet undefined work are not included in the cost estimate.



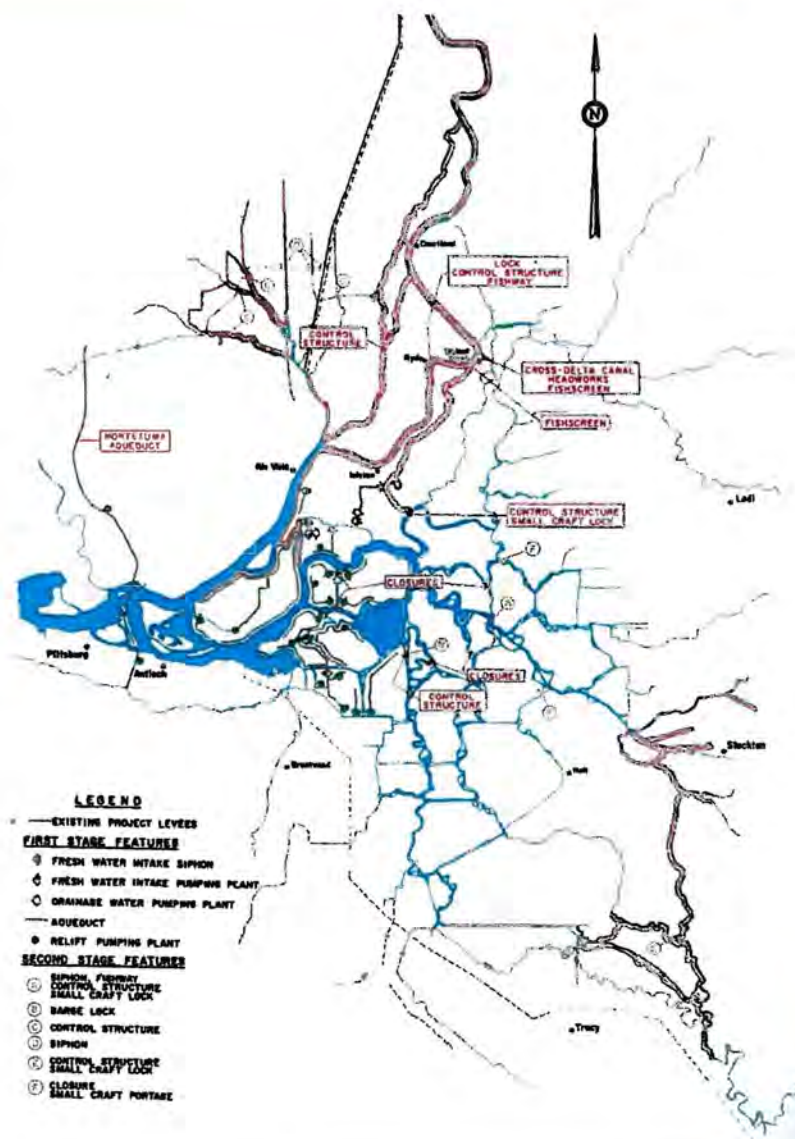
SCHEMATIC DISTRIBUTION
OF DESIGN FLOOD FLOWS

Single Purpose Delta Water Project—physical works

This system of works would accomplish essentially the same results as a barrier at Chipps Island, that is, adequate water supplies for the Delta and for export therefrom, but would not necessitate costly remedial works. Good quality water supplies for the Delta and export pumps would be separated from saline water by control structures operated with a relatively small rate of fresh water outflow. Water would be supplied in the western Delta area through new supply facilities, and in the rest of the Delta existing irrigation and drainage works would continue in operation. There are no flood control features in this plan.

Control structures with gated openings for discharging flood flows would be located on channels of the Sacramento, Mokelumne, and San Joaquin Rivers. A barge lock and fishway would be incorporated in the Sacramento River control structure. Earth fill channel closures would be constructed at four locations. In 1980-82, additional gates would be constructed at the existing headworks of the Delta Cross Channel of the Central Valley Project. Small craft locks and portage facilities would be incorporated in certain control structures and channel closures. Vertical louver fish screens would be constructed at the head of Georgiana Slough and at the Delta Cross Channel near Walnut Grove, and rotary drum fish screens would be constructed at other diversions.

Water supply facilities would serve areas in the western Delta. The Montezuma Aqueduct would be constructed in about 1968-71 and in subsequent stages to serve water to potential industrial land and some agriculture in central southern Solano County, and to supplement supplies in Contra Costa County. Works would also be included to remedy detrimental effects of project operation, such as seepage alleviation along the Sacramento River channels and modifications to existing irrigation and drainage works made necessary by the project.

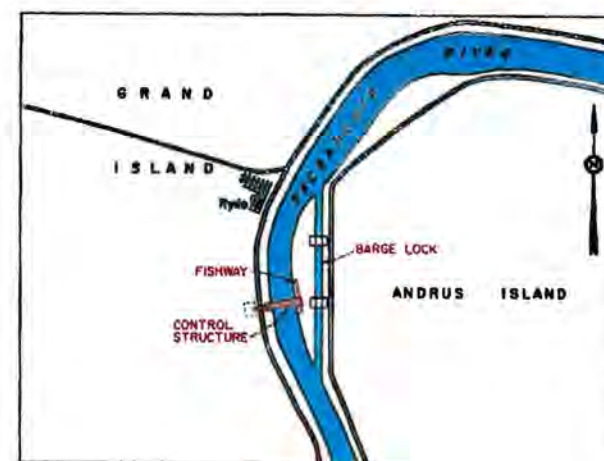


About 1,900 acres of land in the Delta, mostly small unreclaimed islands, would be used for disposal of excess dredged material. Many of these areas would be available and desirable for development as recreation areas.

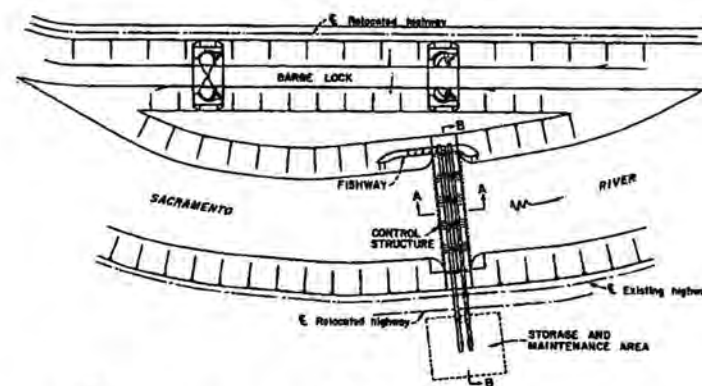
Additional water could be salvaged by completely separating good quality cross-Delta flows from tidal water, and thereby reducing the amount of fresh water outflow needed for salinity repulsion. These second stage features would include a siphon under the San Joaquin River, additional channel closures, control structures and appurtenances, and water supply facilities. These works may be indefinitely deferred, depending on their need.

Estimates of the capital costs reflect 1960 construction costs, plus 15 percent for contingencies and 15 percent for engineering and overhead. The anticipated construction schedule is indicated in the following tabulation:

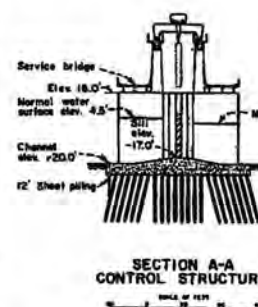
SUMMARY OF ESTIMATED CAPITAL COSTS SINGLE PURPOSE DELTA WATER PROJECT	
Feature and date of construction	Capital cost
Steamboat Slough control structure (1968-70)	\$2,943,000
Miner Slough closure (1970)	108,000
Ryde control structure, barge lock, and fishway (1968-71)	5,653,000
Holland Cut control structure (1973-75)	2,761,000
Mokelumne River control structure and small craft lock (1973-75)	1,951,000
Cross-Delta Canal headworks (1980-82)	1,223,000
Fish screens: Cross-Delta Canal and Georgiana Slough (1968-70)	3,500,000
Closures: Potato Slough, Old River, and Middle River (1974-76)	404,000
Fishermans Cut closures (2) (1964)	133,000
Agricultural water facilities (1963-65)	4,300,000
Municipal and industrial water facilities (1968-71, 1980, 1995, 2010)	13,952,000
Channel dredging (1974-78)	7,154,000
Bank protection (1976-78)	1,880,000
Seepage alleviation facilities (1971)	593,000
TOTAL CAPITAL COST, FIRST STAGE FEATURES	\$46,555,000
TOTAL CAPITAL COST, SECOND STAGE FEATURES	\$23,765,000



RYDE STRUCTURE SITE



PLAN
CONTROL STRUCTURE, FISHWAY AND LOCK



SECTION A-A
CONTROL STRUCTURE



SECTION B-B
CONTROL STRUCTURE AND FISHWAY

Single Purpose Delta Water Project—operation

A Single Purpose Delta Water Project would salvage water otherwise wasted to Suisun Bay for salinity control, and would provide water supplies for the Delta and for export and use in areas of deficiency. The project would allow salinity to encroach somewhat farther into the Delta than under present operations; however, the area affected by this controlled incursion would be supplied water by new facilities. Certain aspects of operation described in the following paragraphs would also apply to other variations of the Delta Water Project.

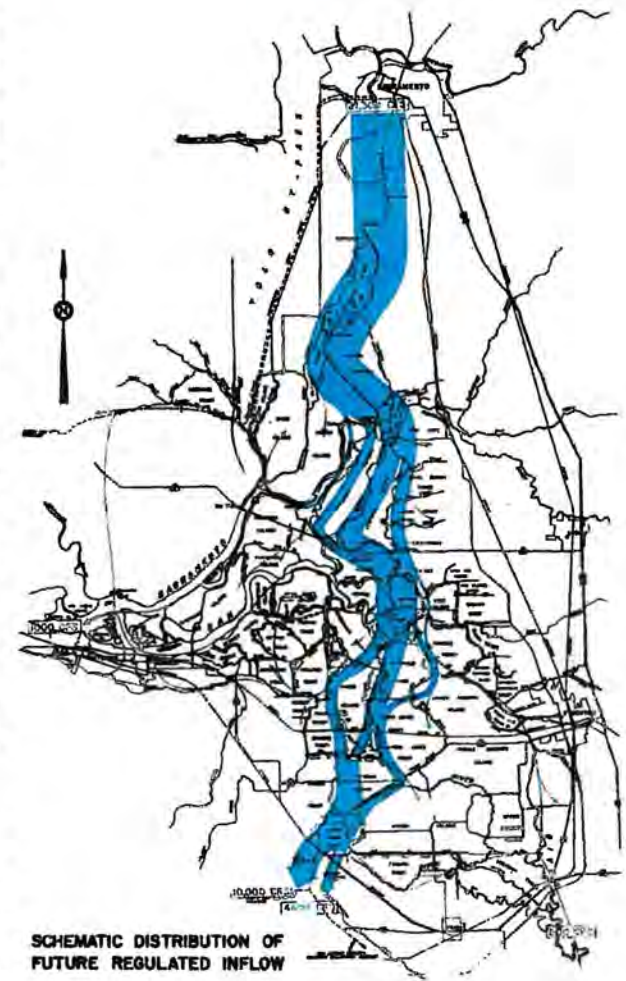
Control structures on the Sacramento River system would divert water southward toward the center of the Delta. Control structures and closures on channels east of Franks Tract would cause the water to flow toward the export pumping plants in channels in the center of the Delta. With this type of operation, it would be necessary to prevent brackish saline water from mixing with fresh water in the center of the Delta. This control could be accomplished by providing fresh water outflow in the Sacramento and San Joaquin Rivers.

The salinity control line, with control to a mean concentration of 1,000 parts of chlorides per million parts of water (1,000 ppm), would be maintained in the San Joaquin River near the mouth of False River,

about 7 miles upstream from Antioch and in the Sacramento River at Decker Island, about 1½ miles below Threemile Slough. Salinity control at these locations could be accomplished by maintaining an outflow from the Delta of 1,000 second-feet, of which about 60 percent would be released through the San Joaquin River and the remainder through the Sacramento River.

Good quality water from the cross-Delta flows would be available in existing channels throughout 90 percent of the Delta lowlands. Water would be provided to all agricultural lands downstream of the line of *maximum* salinity encroachment of 500 ppm of chlorides. The mean concentration of chlorides would be about 250 ppm at locations on this line. Research studies by the University of California indicate that seepage of any brackish water from the channels into the Delta islands can be controlled below the plant root zone by application of good quality water on the surface. The supplies diverted from the cross-Delta flows would normally contain between 20 and 80 ppm of chlorides.

Water would also be provided to municipalities and for certain industrial uses in the western Delta area. Most of the required industrial cooling water could be supplied from the adjacent channels. The Contra



Costa Canal could serve the projected industrial requirements in its service area until about 1970, and significant industrial development in southeastern Solano County is not anticipated before 1980. The Montezuma Aqueduct would be constructed to convey supplemental water from the proposed North Bay Aqueduct and would be linked to the Contra Costa Canal near Pittsburg in 1980. The capacity of the Contra Costa Canal would then be utilized primarily between the Delta and the connection with the Montezuma Aqueduct. The estimated quality of the water would be very good, with a chloride content generally ranging between 15 and 80 ppm, total dissolved solids ranging between 125 and 300 ppm, and with total hardness of between 40 and 160 ppm.

Existing irrigation water supply facilities throughout most of the Delta would not be affected by operation of the export pumps, but the average water level in the southern portion of the Delta would be lowered slightly. Irrigation facilities affected thereby would be modified under the project.

Small increases in tidal amplitudes of about 1.5 feet would occur at the Sacramento River and Steamboat Slough control structure sites, but the mean water level would not significantly change. The effects would be very minor at Rio Vista.

The average water level upstream from the control structures would be gradually raised to a maximum of about 2.5 feet under full project operation in about 30 years. The increase would occur during summer months, and any resultant increased seepage from the channels would be fully consumed by crops on adjoining lands without damage.

During flood periods, the control structures would be opened and flood stages throughout the Delta would be similar to those under present conditions. Flood stages on the Sacramento River would be slightly higher for longer periods due to closing of Miner Slough. This effect would tend to increase seepage conditions during a critical crop planting time, and might necessitate installation of seepage alleviation works. Such works would also alleviate existing seepage problems.

The future value of water and quality considerations might justify construction of the second stage features to permit further reduction in the fresh water outflow from the Delta. The outflow could be reduced to the amount of unavoidable losses, or about 750 second-feet. The value of the additionally salvaged water would probably not justify construction of these works before 1990.



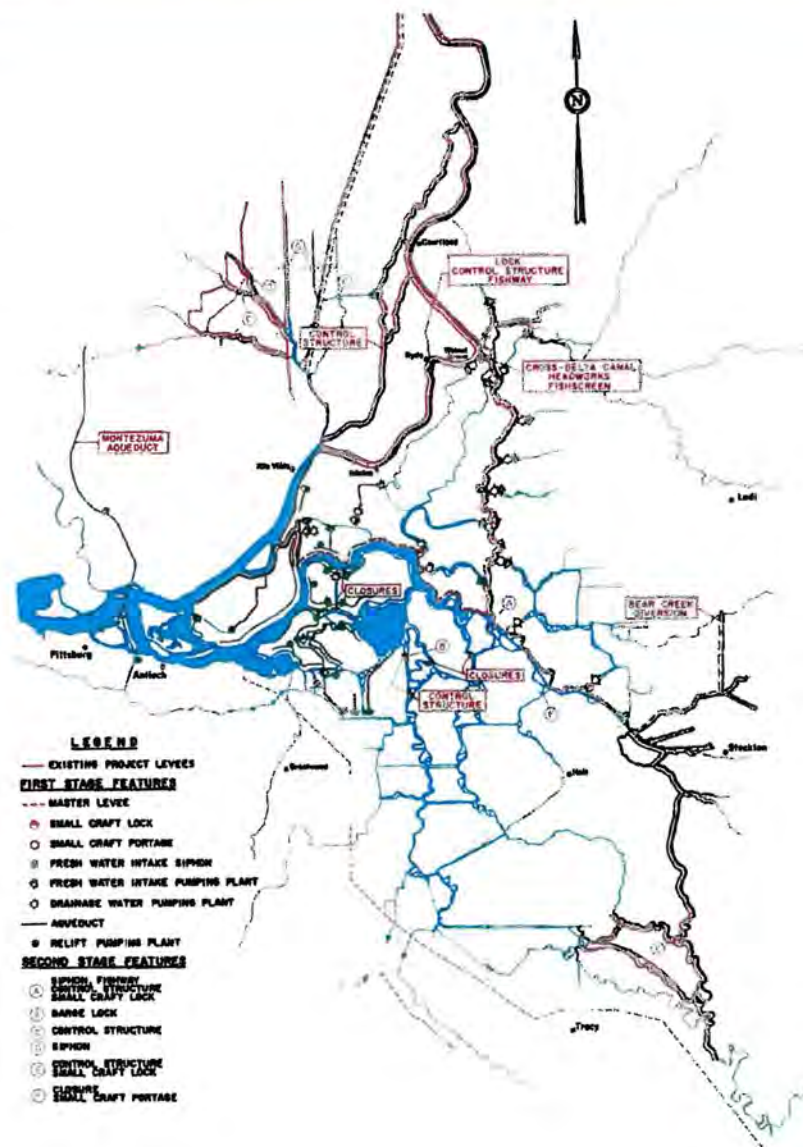
Typical Alternative Delta Water Project — physical works

Several additional features can be added to the basic Single Purpose Delta Water Project to provide varying degrees of local benefits, in addition to adequate water supplies. These additional features would be for flood and seepage control, transportation, and recreation. While the economics of construction and operation factors would dictate grouping certain islands within encircling master levee systems, flood protection for any one or more of several groups of islands could be undertaken.

The Typical Alternative Delta Water Project, one of several alternative plans, would include flood protection for the islands in the north central portion of the Delta around Isleton, and for the northeastern islands in the vicinity of Lodi. Fourteen channel closures would be required in addition to those incorporated in the Single Purpose Delta Water Project. Minor modifications and additions would be made in the irrigation water supply and drainage facilities. Rotary drum fish screens would be incorporated where required in all water supply works, and a vertical louver screen would be constructed at the headworks of the Cross-Delta Canal at Walnut Grove. Bear Creek would be diverted into the Calaveras River.

The master levee system would include existing levees of the Sacramento River Flood Control Project. Other existing levees would be improved by constructing a berm on the landward side, and by raising the levee crown where necessary to increase the freeboard. Public roads would be relocated from levee crowns to the berms. A service and maintenance road would be placed on the crown of the levees.

Small craft locks would be constructed at certain channel closures. At locations where rapid transits of boats under 25 feet long would be necessary, a tank elevator boat portage would be installed.



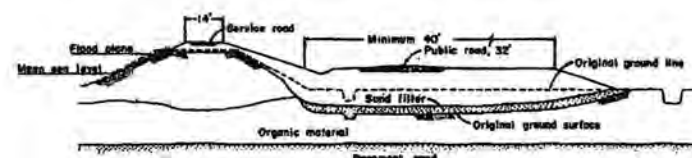
About 1,900 acres of Delta land would be filled with excess dredged material, and most of this land would be available for recreational development. The additional gates on the Cross-Delta Canal headworks and the extensions of the adjacent highway and railroad bridges would be constructed with about 16 feet of clearance above the present average water level to improve small craft access between the Sacramento River and channels of the Mokelumne River system.

The second stage features of this project would be similar to those contemplated for the Single Purpose Delta Water Project.

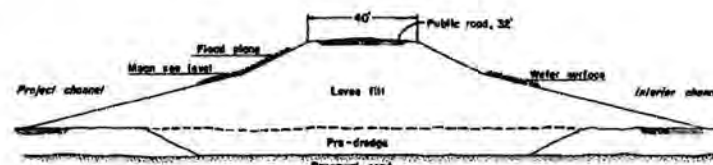
Estimates of capital cost were based on 1960 construction costs plus 15 percent for contingencies and 15 percent for engineering and overhead.

**SUMMARY OF ESTIMATED CAPITAL COSTS
TYPICAL ALTERNATIVE DELTA WATER PROJECT**

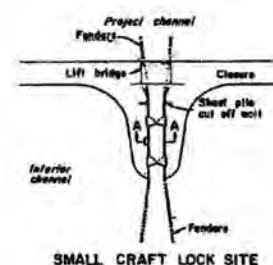
Feature and date of construction	Capital cost
Steamboat Slough control structure (1968-70)	\$2,943,000
Miner Slough closure (1970)	108,000
Ryde control structure, barge lock, and fishway (1967-70)	5,653,000
Holland Cut control structure (1973-75)	2,761,000
Cross-Delta Canal headworks (1975-77)	1,998,000
Cross-Delta Canal fish screen (1968-70)	3,500,000
Old River and Middle River closures (1975)	258,000
Fishermans Cut closures (2) (1964)	133,000
Agricultural water facilities (1963-65)	4,282,000
Municipal and industrial water facilities (1968-71, 1980, 1995, 2010)	13,952,000
Channel dredging (1974-78)	7,224,000
Master levee system (small craft locks and portages, irrigation and drainage works)	
Isleton island-group (1964-80)	12,610,000
Lodi island-group (1964-81)	11,439,000
Bear Creek diversion (1967-70)	670,000
TOTAL CAPITAL COST, FIRST STAGE FEATURES	\$67,531,000
TOTAL CAPITAL COST, SECOND STAGE FEATURES	\$23,635,000



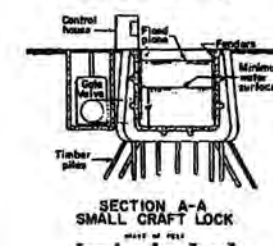
TYPICAL SECTION OF MASTER LEVEE



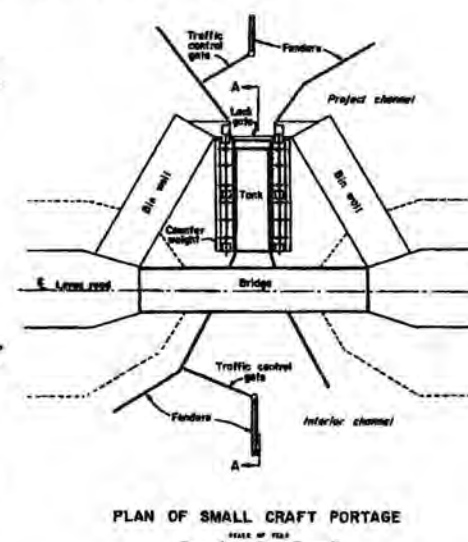
TYPICAL SECTION OF CHANNEL CLOSURE



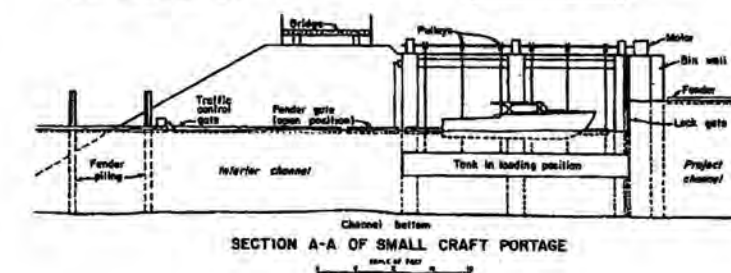
SMALL CRAFT LOCK SITE



SECTION A-A
SMALL CRAFT LOCK



PLAN OF SMALL CRAFT PORTAGE



SECTION A-A OF SMALL CRAFT PORTAGE

Typical Alternative Delta Water Project — operation

Operation of the Typical Alternative Delta Water Project would be basically the same as with the Single Purpose Delta Water Project. Good quality water would be transferred directly across the Delta and degradation in water quality from salinity incursion would be prevented by limited releases of fresh water with the same degree of control as under the Single Purpose Delta Water Project. Water supplies for the Delta would be distributed from the cross-Delta flows.

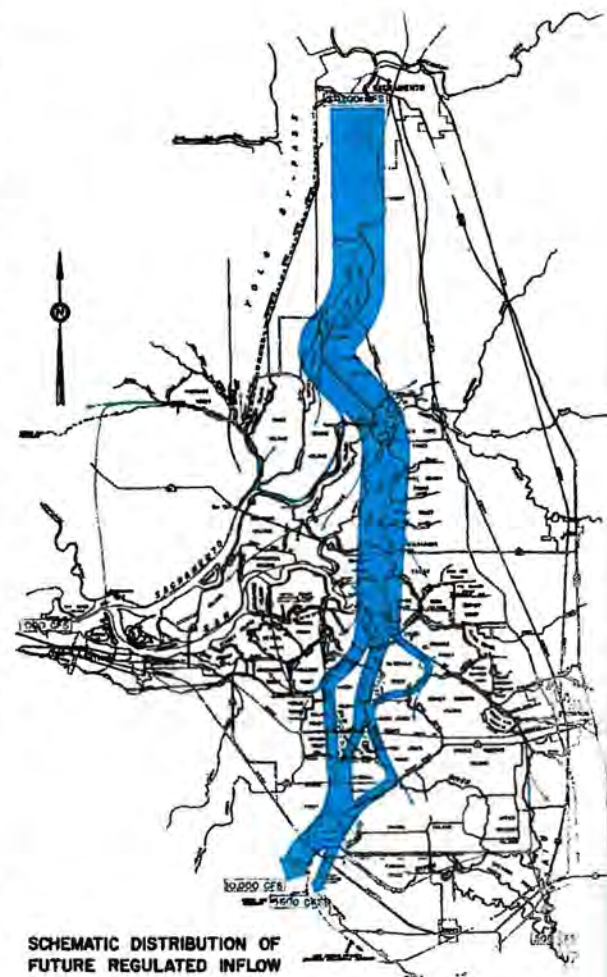
Irrigation water for the Isleton island-group and the Lodi island-group would be diverted through siphons from the Cross-Delta Canal into interior channels. Existing diversion works out of the Cross-Delta Canal, which would be rebuilt during construction of the master levees, and diversion works out of the interior channels would continue in operation. Drainage pumping plants at channel closures would have capacity to remove all water pumped from the islands into the interior channels. Under all alternative plans for the Delta Water Project, the irrigation and drainage works would be managed by local districts. Adjustments in costs of operation and maintenance would be made with the districts to reflect

costs allocated to interests other than the local districts. Water supply facilities serving several districts or agencies would be operated by the State or by an appropriate master district or agency.

Flood flows would be contained in principal project channels in those portions of the Delta protected by the master levee system, and levees along interior channels would no longer be subject to high flood stages. Levees on interior channels would not need to be as high as for present conditions, and could be allowed to settle. Experience has shown that Delta levees reach a state of equilibrium if they are allowed to settle a limited amount. Thus much of the periodic reconstruction of the interior levees would no longer be necessary. Bank erosion problems due to flood flows also would be eliminated on interior levees.

Storm runoff from upland areas surrounding the Delta would be pumped into flood channels, except in the case of Bear Creek which would be diverted into flood channels.

Water levels in the interior channels could be lowered to achieve reductions in the amount of seepage into the islands. In



practically all channels the level could be five feet lower than the present average level, or about three feet below sea level, without causing maneuvering problems for small craft. Any resultant shallow depths in specific locations could be increased by dredging.

Small craft locks and portage facilities would be operated without cost to the boating public as the costs would be allocated to beneficiaries of the master levee system. The locks would be operated in a standard manner with pumps for filling and draining. The boat portages would be tank elevators with a gate at one end. The tank would be lowered below the hull of the boat, and the boat would then move between guides over the tank. The counter-weighted tank would then be raised to the higher water level and the gate opened to permit the boat to move out under its own power. The time for operation after positioning of the boat over the tank would be less than one minute. The boat would be in the water at all times and there would be no contact with the bottom of the hull.

The operation and maintenance of public roads located on the berm of the master

levees would be less costly than for existing roads, which must be periodically reconstructed due to levee settlement and levee rebuilding. Maintenance of the public roads would be by local agencies. Closures in the master levee system of this plan would eliminate the need for continued operation of four ferries.

Reduction of the water surface area under tidal influence would cause limited increases in tidal amplitudes in the Delta, but no significant changes in the average water levels. Such changes on the Sacramento River and Steamboat Slough would be similar to those under the Single Purpose Delta Water Project, and amplitude changes in the San Joaquin River in the heart of the Delta would be less than one foot. However, dredging would be necessary in some navigable channels.

Small islands in bends and side channels, which would be reclaimed and raised by filling, would be available for recreational development after the areas are no longer needed for disposal areas. It is contemplated that arrangements would be made with local governmental agencies for recreational development of the lands, either by direct means or by leasing to concessionaires.



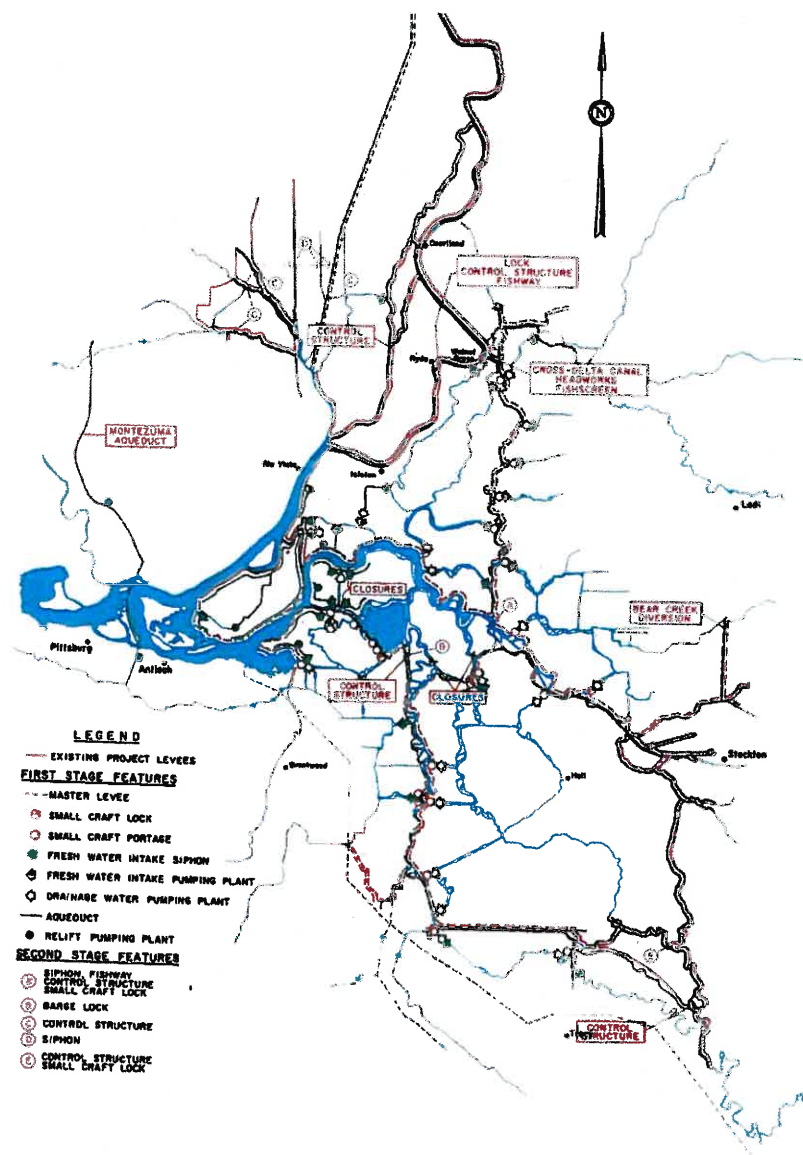
Comprehensive Delta Water Project—physical works

The Comprehensive Delta Water Project would salvage water otherwise needed for salinity control and provide water for the Delta. In addition, the project would provide flood and seepage control, transportation, and recreation benefits for most of the Delta. New master levees would encompass five principal groups of islands and Sherman Island. Works for water supply and drainage in the Delta would include those of the Typical Alternative Delta Water Project, with some modifications, plus other works to serve the newly formed island-groups. Additional small craft facilities would also be constructed.

Flood waters of the San Joaquin River would be divided between the main channel and an improved chain of distributary channels to the west, the two branches coming together in the western Delta. Improved channels of the Lower San Joaquin River Tributaries Flood Control Project would be incorporated.

The master levee along Piper Slough east of Bethel Island would be constructed on old levees on Franks Tract to minimize interference with existing developments on the Bethel Island levee.

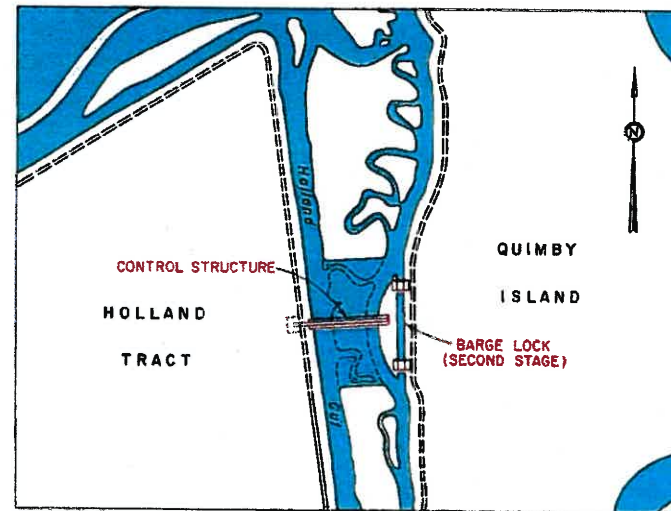
The additional interior channels created by the project in northeastern Contra Costa County would contain good quality water, and would serve as a fresh water distribution system for the adjacent islands. Intensive small craft traffic in the vicinity of Bethel Island would necessitate the construction of four small craft portage facilities in adjacent channels and one small craft lock at Sand Mound Slough.



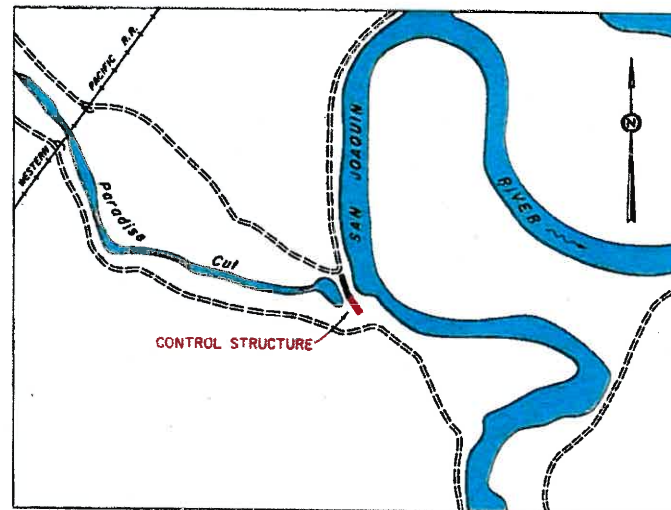
The second stage features of the Comprehensive Delta Water Project would be similar to those in other variations of the Delta Water Project.

Estimates of the capital costs reflect 1960 construction costs, plus 15 percent for contingencies and 15 percent for engineering and overhead.

SUMMARY OF ESTIMATED CAPITAL COSTS COMPREHENSIVE DELTA WATER PROJECT	
Feature and date of construction	Capital cost
Steamboat Slough control structure (1968-70)	\$2,943,000
Miner Slough closure (1970)	108,000
Ryde control structure, barge lock and fishway (1967-70)	5,653,000
Holland Cut control structure (1973-75)	2,761,000
Cross-Delta Canal headworks (1975-77)	1,998,000
Cross-Delta Canal fish screen (1968-70)	3,500,000
Old River and Middle River closures (1975)	258,000
Fishermans Cut closures (2) (1964)	133,000
Agricultural water facilities (1963-65)	2,520,000
Municipal and industrial water facilities (1968-71, 1980, 1995, 2010)	13,952,000
Channel dredging (1968-78)	8,950,000
Master levee system (small craft locks and portages, irrigation and drainage works)	
Isleton island-group (1964-80)	12,610,000
Lodi island-group (1964-81)	11,439,000
Holt island-group (1964-80)	13,810,000
Tracy island-group (1968-74)	4,722,000
Brentwood island-group (1964-79)	9,802,000
Sherman Island (1964-79)	2,030,000
Paradise Cut control structure (1969-71)	121,000
Bear Creek diversion (1967-70)	670,000
Kellogg Creek diversion (1971)	79,000
TOTAL CAPITAL COST, FIRST STAGE FEATURES	\$98,059,000
TOTAL CAPITAL COST, SECOND STAGE FEATURES	\$21,560,000



HOLLAND CUT STRUCTURE SITE



PARADISE CUT STRUCTURE SITE

Comprehensive Delta Water Project—operation

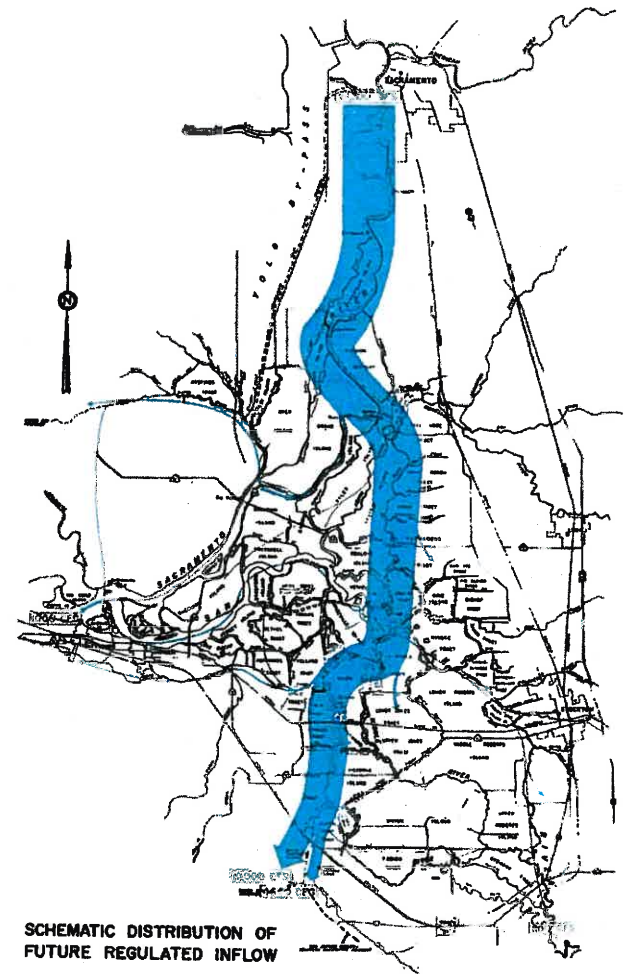
Integrated operation of the multipurpose facilities of the Comprehensive Delta Water Project would enhance all principal phases of the Delta's economy, salvage water otherwise needed for salinity control, and provide very good quality water throughout the Delta. Although the project would have some adverse effects on certain segments of the Delta's economy, such as recreation and navigation, the multipurpose works would afford opportunity for enhancement of these same segments in other ways.

Operation of the water supply and transfer facilities during summer months would be similar to that described for the Single Purpose and Typical Alternative plans. Where representative districts or agencies are organized, the facilities could be locally operated and maintained, and appropriate adjustments in costs thereof could be made to achieve equitable distribution of costs to all beneficiaries.

Creation of interior and project channels in the southern portion of the Delta would separate irrigation water supplies from drainage water originating on lands east of the San Joaquin River. Good quality water from cross-Delta flows would be available throughout most of the southern Delta.

Lands adjacent to the San Joaquin River upstream from Stockton would continue to divert from the river, but the quality of the water in this area could be improved by upstream flow in the San Joaquin River past Stockton induced by the pumping plants. A small net upstream flow occurs during summer months under present conditions. The quality of water in Paradise Cut could also be improved with circulation induced by pumping from the upper end into the San Joaquin River. Diversions from the river in this vicinity might be affected by operation of a San Joaquin Valley waste conduit. If current studies indicate that substitute supplies would then be necessary, or if further improvement of the quality of the supplies is desired even in the absence of adverse effects of a waste conduit, such supplies could be readily diverted from Delta channels without affecting works described herein.

Lands in the Holt island-group in the south central portion of the Delta range in elevation from several feet below sea level to a few feet above sea level. Irrigation water for the higher islands is pumped from the channels, while siphons are utilized for the lower islands. To achieve seepage control benefits for the lower islands, water



SCHEMATIC DISTRIBUTION OF
FUTURE REGULATED INFLOW

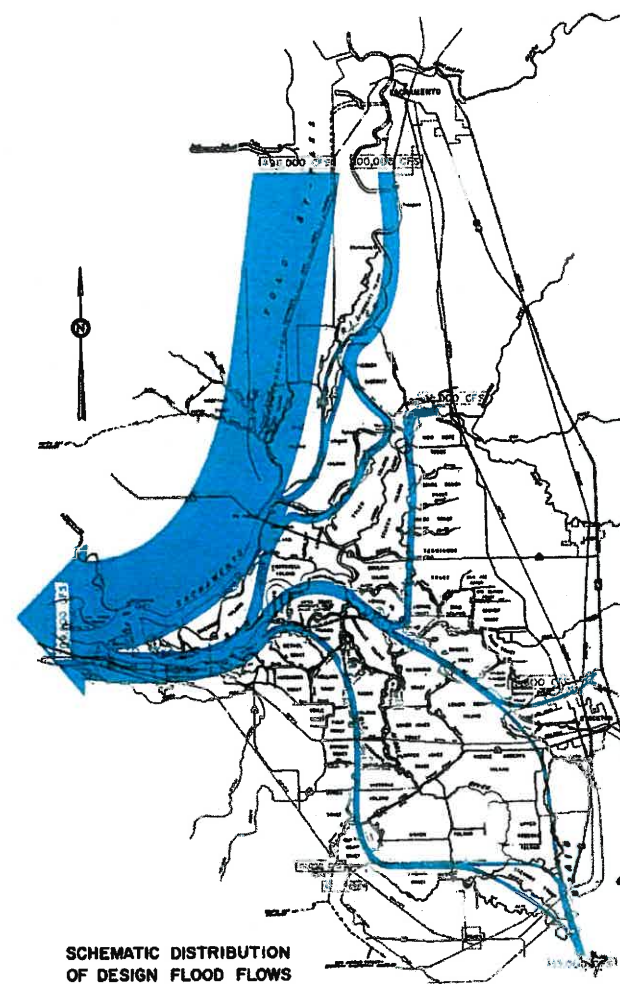
levels in the channels could be lowered. This could be accomplished locally without detriment to the higher lands by constructing low dams with pumping plants in the channels and maintaining different water levels in the interior channel system.

Large volumes of small craft and fishing boats move between marinas and resorts in the Bethel Island area and Franks Tract or more distant points in the Delta and San Francisco Bay system. Peak small boat traffic would be served by three small craft portages on Piper Slough, and by one small craft lock on Sand Mound Slough. Lock or portage service for small craft would be provided at various other locations in the Delta when dictated by construction of channel closures. It should be recognized that subsequent developments and changes in patterns of use may necessitate revisions in the planned local service. While the lock and portages would cause some inconvenience to recreationists, creation of interior channels not subject to flood and tidal stages would benefit shore line installations. An expected great increase in boating in the future would intensify problems of patrolling and safety enforcement. Opportunities would be available to local public agencies

to designate certain waterways for specific uses, and problems of regulation would be reduced under controlled access.

Master levees of the project in the southern half of the Delta would cause increased tidal amplitudes in the project channels. The maximum increase in the San Joaquin River system would be about one foot at Stockton. There would be no significant change in the mean water level. Some dredging in navigation channels would be necessary.

Tug and barge shipments into the southern Delta would be limited to the Cross-Delta Canal. Most of the present traffic involves beet shipments to a sugar refinery near Tracy, and the Holland Cut channel east of Franks Tract is generally used. The Cross-Delta Canal would be open to the San Joaquin River, and a barge lock at the Holland Cut control structure would not be economically justified. Although a slightly greater travel distance from northern and western Delta points would be involved under the project, the channel to the vicinity of the sugar refinery would be dredged. This would permit use of larger barges, which are presently precluded by shallow channel depths.



SCHEMATIC DISTRIBUTION
OF DESIGN FLOOD FLOWS

Project Accomplishments—Delta water supply

Over 90 percent of the Delta lowlands now has adequate water supplies during summer months due in part to operation of the Central Valley Project. However, ten percent of the Delta in the western portion, including lands occupied by large water-using industries and municipalities, does not have adequate good quality water supplies at all times. Moreover, additional regulation and use of water in areas tributary to the Delta, exclusive of Delta exports, will lengthen the average period each year when salinity incursion from the Bay causes increased operating costs, plant shutdowns, and decreased farm production. The concentrations of dissolved minerals in water from the Contra Costa Canal now approach upper limits of acceptable quality during several months of most years, and significant sums of money are expended by industries for demineralization and water softening.

Under any of the foregoing projects, water of very good quality would continue to be supplied to about 90 percent of the Delta lowlands through existing facilities. It is estimated that the mineral quality of the supplies would generally range between about 15 to 80 parts of chlorides and between 100 and 350 parts of total dissolved solids per million parts water. The quality of water in the southern portion of the Delta would be improved.

The quality of water in the Pittsburg-Antioch area with the Chipps Island Barrier Project in operation would be uncertain. Although downstream disposal of local municipal and industrial wastes and drainage from the San Joaquin Valley would eliminate the majority of the mineral pollutants, the effects of cooling water and mineral and organic wastes of the Delta might result in water supplies of questionable quality, particularly during critical dry

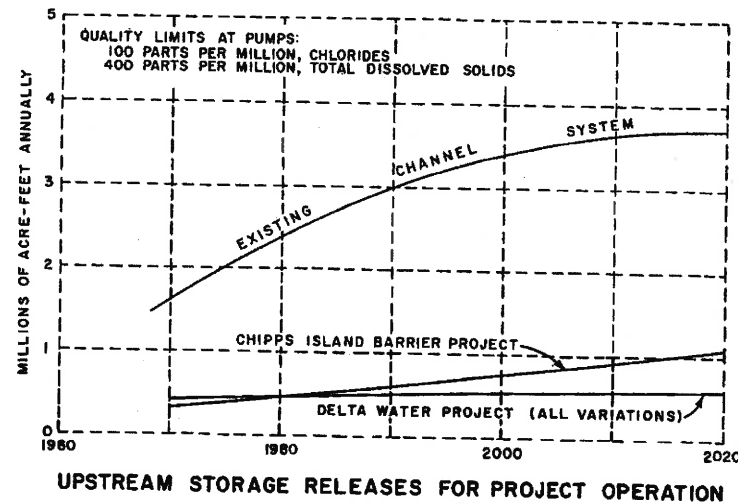
periods. Elimination of the tidal effects in this area by construction of the barrier would also reduce the supply of dissolved oxygen in the water, which is now partly replenished from Suisun Bay.

All of the alternative plans for the Delta Water Project would involve dual water supplies with different water quality characteristics. While the concentrations of minerals in water in certain western channels would increase due to greater ocean salinity incursion, the quality of water from the Contra Costa Canal and from proposed water supply facilities would be excellent. It is estimated that substitute industrial water supplies would generally contain between 15 and 80 parts of chlorides per million parts of water. Similarly, the total dissolved solids would generally range between 125 and 300 parts per million. Irrigation water supplies would be of similar quality. The Contra Costa Canal would annually supply about 195,000 acre-feet of water, including some substitute water in northeastern Contra Costa County. All additionally required supplemental and substitute water would be supplied from the Montezuma Aqueduct. This annual quantity would amount to about 120,000 acre-feet in 1990 and 330,000 acre-feet in 2020. Brackish water supplies in the western Delta channels would vary in quality with location. The mean quality would be about 3,000 parts of chlorides per million parts water at Antioch during summer months. Water containing this much salinity is not necessarily damaging to cooling equipment involving alloy metals. A composite of several factors, most of which would not be modified by alternative plans for the Delta Water Project, controls the rate of corrosion of cooling equipment.

Project Accomplishments — water salvage

Unless physical works are constructed in the Delta to prevent salinity incursion from the Bay system, or to channelize fresh water directly across the Delta channels, it will be necessary to release increasingly greater amounts of fresh water from upstream storage to maintain satisfactory quality conditions. Greater rates of fresh water outflow will be necessary as the rate of export pumping from the Delta increases, and greater quantities of stored water will have to be released as the amount of surplus water for outflow is reduced by upstream depletions and export from the Delta. If Delta works are not constructed, the yield of other features of the State Water Facilities would be reduced and subsequent features for importation of water from north coastal sources would be needed at an earlier date. Any such modifications in the program would increase the cost of water in the Delta.

With any of the plans for the Delta water facilities, the amount of outflow from the Delta otherwise necessary for salinity control would be greatly reduced. It would still be necessary to dispose of municipal and industrial wastes from the western Delta, and drainage from the San Joaquin Valley, into channels downstream from points of usable good quality water. All of the plans are comparable in this respect, except that these wastes would aid in repulsion of ocean salinity incursion with any of the alternatives of the Delta Water Project. Fresh water required for operation of locks and the fishway would be lost with a barrier at Chipps Island, but would be available for use downstream of the control structures with any of the alternatives of the Delta Water Project. A small amount of conservation yield could be obtained from limited storage in Delta channels with a barrier at Chipps Island, but alternatives of the Delta Water Project would not provide conservation storage.



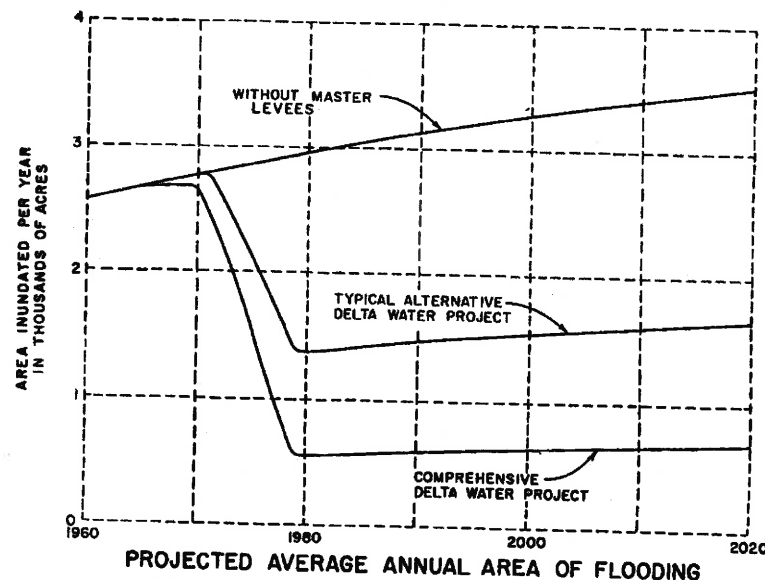
The amount of water otherwise necessary for salinity control which could be salvaged by Delta water facilities would vary with time, as indicated by the above graph. The amount of salvaged water would be the difference between demands on upstream storage for outflow without any works in the Delta, and demands with such works in operation. The estimated average annual salvage during the next 60 years would be 1,900,000 acre-feet with the Chipps Island Barrier Project, and 2,050,000 acre-feet with any of the alternative plans for the Delta Water Project.

Project Accomplishments—flood and seepage control

Only the Typical Alternative Delta Water Project and the Comprehensive Delta Water Project would provide flood and seepage control benefits to the Delta. However, all plans would include remedial works made necessary by adverse effects of flood or tidal water stages changed by project operation. These would be particularly necessary with the Chipps Island Barrier Project.

Project flood control benefits would result from reduction in the frequency of flooding, and from reductions in costs of maintaining Delta levees. It is emphasized that complete flood protection could not be assured, as the inflow to the Delta could exceed the designed capacity of the channels. Furthermore, although the stability of the master levees would be significantly greater than the stability of existing levees, the character of organic foundation soils is such that unforeseen stability problems might develop in some areas. For these reasons, emphasis should be given to zoning Delta lands lying below flood levels for uses involving low-value improvements such as farming, and precluding residential development. While complete flood protection for the Delta lands could not be assured under project conditions, there would be a marked improvement in protection over existing conditions which will worsen as land elevations in the Delta continue to subside.

About 103,000 acres would be benefited by master levees included in the Typical Alternative Delta Water Project, and about 143 miles of levees along interior channels would no longer require costly maintenance for high flood stages. The estimated average annual benefit of reduced flooding and operation and maintenance costs would be about \$4.65 per acre. Master levees of the Comprehensive Delta Water Project would benefit about 252,000 acres and would reduce expensive maintenance on 295 miles of interior channel levees. The estimate of average annual flood control benefits is about \$3.60 per acre.



Seepage control benefits would be made available by lowering water levels in interior channels created by the Typical Alternative Delta Water Project or by the Comprehensive Delta Water Project. In addition, lower water levels would prolong the economic life of certain islands. These benefits and the extent of increased economic life would depend upon lowering average water levels in the interior channels. A general lowering of five feet could be made without adversely affecting depths for small craft, except in isolated locations, or the majority of water supply siphons. Based upon a five-foot lowering of water levels, seepage control benefits, averaging an estimated \$0.50 per acre for 103,000 acres, would be available with the Typical Alternative Delta Water Project. The Comprehensive Delta Water Project would afford seepage benefits to 252,000 acres, and the estimated average annual benefit would be \$0.45 per acre.

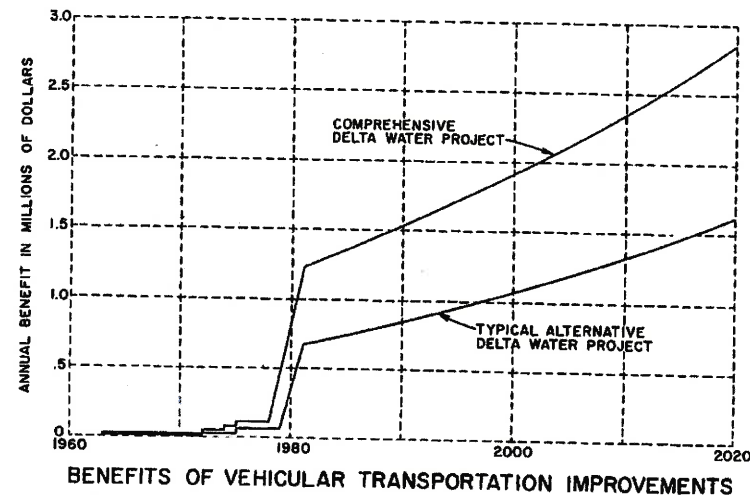
Project Accomplishments—vehicular transportation

The two basic problems of the existing road system in the Delta are (1) inadequate channel crossings and circuitous routes, with resultant excessive travel times, and (2) disproportionately high costs of maintenance. Projects involving master levees for flood control in the Delta would afford means for reducing both of these problems. However, the Chipps Island Barrier Project would provide no benefits to vehicular transportation, and the Single Purpose Delta Water Project would provide only incidental benefits of this kind.

The master levee system of the Typical Alternative Delta Water Project would include twenty-two channel closures upon which roads could be placed, and operation of four existing ferries could be terminated. The Comprehensive Delta Water Project would include thirty-nine channel closures providing new access and would eliminate the need for six ferries.

Roads on the landward berms of the master levees would be more stable and less difficult to maintain than existing roads on levee crowns. Driving on present levee roads is hazardous, as evidenced by frequent drownings when vehicles run off levees into adjacent channels. Passing clearance is often limited by parked vehicles. In addition to improved safety with roads on the levee berms, there would be ample width for parking off the roadways.

To realize the anticipated and needed development of recreation in the Delta, it will be necessary to greatly improve vehicular access. Realization of about 7,000,000 recreation-days each year by 1990, and almost 14,000,000 by 2020 will, in large degree, be dependent upon the improved vehicular access that could be provided by multipurpose use of the master flood control levees.



The project benefits from enhancement of the road system would be a combination of savings in maintenance costs and savings in costs to Delta traffic associated with farming and to the recreationists. Savings to Delta interests reflect reduced costs of general travel and produce shipments through decreased travel times and distances. Savings to the recreationists were based upon projected recreation use and decreased travel times and distances.

Project Accomplishments — recreation

While some detriments to recreation are inherent in construction of any facilities in the Delta, substantial benefits would also be achieved. As has been stated, improvements in the road network would make more of the Delta accessible to recreationists. Land areas reclaimed by spoiling material from dredging of channels onto small islands would afford space for development of recreation service facilities and picnic areas. Project works at the head of the Cross-Delta Canal would be constructed to provide clearance for the majority of pleasure craft, thereby connecting the Sacramento and Mokelumne River systems. Elimination of flood and tidal effects from interior channels would make it possible to control water levels in those channels, reducing costs of maintaining waterfront recreation facilities. Furthermore, costs of new facilities would be less than for present conditions. The safety of the boating public is becoming a significant problem, and the incompatibility of high-speed boating, cruising, and skiing with fishing and swimming creates related safety problems. Local authorities will find it desirable and even necessary to designate certain Delta channels for specified types of recreation use. The interior project channels would lend themselves to this type of zoning and also to simplified enforcement.

Planning and construction of recreational developments in the Delta should involve local governmental agencies. Most project channel closures would not be constructed for eight or more years, and changing recreation patterns should be considered in future selection of remedial and enhancement facilities. Needs for small craft locks and boat portages should be re-evaluated at the time closures are constructed.

The most important form of recreation in the Delta is fishing. In terms of recreation-days, fishing is three times as important as the next most popular sport—cruising. A project which would cause a major reduction in fish populations might also cause very adverse effects on the recreation. In this connection the Chipps Island Barrier Project would result in losses of striped bass sev-

eral times as great as those anticipated with any of the alternative plans for the Delta Water Project.

It is recognized that cruising, sailing, and water skiing are rapidly gaining in popularity in the Delta, and that construction of master flood control levees and channel closures would interfere with unrestricted boating access to certain channels. However, access would be provided through small craft locks or portage facilities at many of the channel closures, thus reducing the detriment primarily to short delays. Studies in other areas indicate that lockage delays are not too important to the majority of pleasure boatmen.

The following tabulation summarizes physical features of the several alternative projects which would affect recreational activity and growth in the Delta.

Item	Chipps Island Barrier Project	Single Purpose Delta Water Project	Typical Alternative Delta Water Project	Comprehensive Delta Water Project
Control structures	1	4	3	4
Channel closures	1	10	23	41
New master levees (miles).....	0	0	90	185
Fishways	1	1	1	1
Principal fish screens.....	0	2	1	1
Barge locks	1	1	1	1
Small craft locks.....	0	0	2	5
Small craft portage facilities.....	0	0	5	17
Open navigable area (acres).....	49,500	49,400	45,800	42,600
Navigable interior area (acres).....	0	100	3,700	6,900
Open navigable channels (miles).....	700	695	590	450
Navigable interior channels (miles).....	0	5	110	250
Project roads (miles)				
Paved	0	0	33	70
Graveled	0	1	47	109
State and county levee roads (miles)	295	295	279	265
New inter-island accesses (closures)	0	6	22	39
New public waterfront land (acres)				
From master levees.....	0	0	1,900	3,600
From dredge spoils.....	0	1,900	1,900	2,300
Normal overhead clearance through Delta Cross Channel (feet).....	6	16	16	16

Project Accomplishments — fish and wildlife

Any Delta water facilities would affect the habitat of fish in the Delta, but would have little effect, if any, on Delta wildlife. While it is known that the Delta plays an important role in the life cycle of migratory fish, and also supports resident sport fish, insufficient biological information is available with which to clearly define the potential effects of Delta water facilities. Nevertheless, relative comparisons of the alternative projects can be made.

Studies of effects of the Delta water facilities and export pumping plants were made by the California Department of Fish and Game in co-operation with the Department of Water Resources. Cooperative experiments with a full-scale vertical baffle fishway indicate that all migratory species would use this type of fishway. The conclusions of the Department of Fish and Game regarding the alternative projects are as follows:

"Chippis Island Barrier"

"This project would be the most damaging of the four studied. It would probably cause a disastrous reduction of almost all species of fish found in the Delta. These losses would be brought about by the rapid salinity and temperature change across the barrier, loss of current in the fresh-water pool for migration direction, striped bass spawning eliminated due to lack of current behind the barrier, loss of important food items, and a threefold increase in pumping of water at Tracy. The amount of

Sacramento River water being drawn around the tip of Sherman Island to the pumping plant would be greatly increased. Downstream migrants of the Sacramento River would be diverted to the pumps in large numbers. These fish would have to be screened at the pumps and returned to the river channel below the influence of this current. This condition would be a serious detriment to all fish using the Delta.

"Single Purpose Delta Water Project"

"This project would be the least detrimental of the four projects studied. The reversal of flow around Sherman Island would be eliminated. Major fish screens would be installed at the Cross-Delta Canal headworks and at the head of Georgiana Slough. Therefore, downstream migrants in the Sacramento River would be guided down the western side of the Delta out of the influence of the pumps. In general, fish and eggs in the western portion of the Delta would no longer be affected by the pumps. The replacement of the hundreds of existing small irrigation siphons in the western Delta by screened irrigation supply systems would further reduce losses of small fish. In these respects conditions for fish in the Delta would be improved.

"Fish habitat would not be reduced in the Delta. The one channel that would be isolated under this project would be insignificant. An important effect of the project would be the increased reversal of flow in the San Joaquin River above the Cross-Delta Canal crossing. This reversal of flow would occur during an average of seven months of the year under full project operation. We were unable to evaluate the effect of the reversal. However, it could result in serious losses to salmon that now spawn in San Joaquin River tributaries south of the Mokelumne River. Most seriously affected would be upstream migrating salmon. The amount of water pumped from the Delta would be increased threefold. This increased withdrawal of water would divert proportionately more fish than is presently being diverted.

"Typical Alternative Delta Water Project"

"This project would be the second least detrimental. Losses would be expected to be greater than the Single Purpose Project because of the reduction of 8 percent of the fish habitat through channel closures, and partial

channelization of the Cross-Delta Canal. The channelization would cause a detriment by channeling the fish toward the pumps by a more direct route. Water diversions into isolated channels would be screened and loss of fish would be reduced. However, loss of eggs and fry would be unavoidable. Other project conditions would be the same as the Single Purpose Project.

"Comprehensive Delta Water Project"

"This project would be the third least detrimental. It would cause greater loss than the Typical Alternative Project because of the reduction of 14 percent of the fish habitat, and the complete channelization of the Cross-Delta Canal. This would channel the fish directly to the pumps. Other project conditions would be the same as in the Single Purpose Project.

"From the foregoing, if one of the above-named projects is to be built in the Delta, the Department of Fish and Game would favor the Single Purpose Delta Water Project. However, all projects will cause serious fisheries problems and an intensive study would be required to solve these problems."

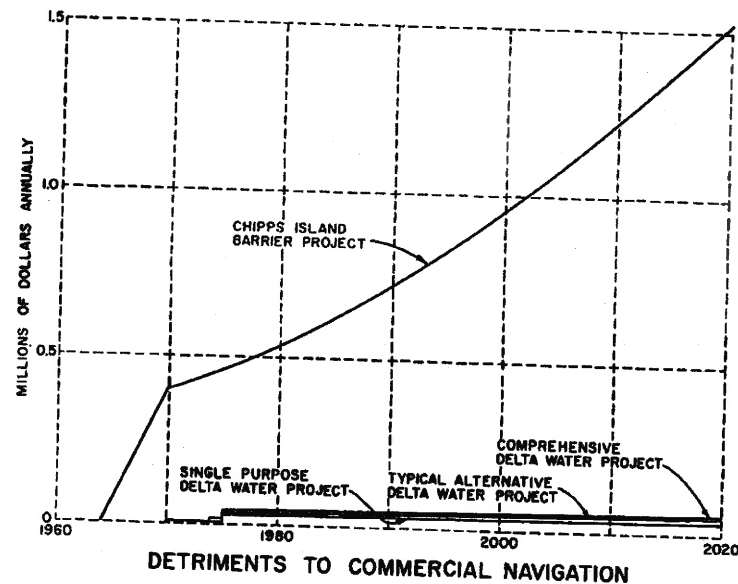
Formulation of project plans reflects comments and recommendations of the Department of Fish and Game. Fish screens would be installed at the heads of channels diverting water southward from the Sacramento River. Such screens would reduce the present rates of fish losses at the Tracy Pumping Plant and in numerous other diversions in the Delta. Project pumping plants would also be screened. Hundreds of diversion siphons and pumping plants in the Delta are not screened at this time. However, project diversions into interior channels would be screened, and the fish populations enhanced thereby.

Project Accomplishments—navigation

Commercial and military navigation in the Delta would be adversely affected in varying degrees by any Delta water facilities, but some potential benefits would also be realized through increases in channel depths and widths.

The Chipps Island Barrier Project would cause the greatest detrimental effect to navigation, since all traffic between the San Francisco Bay system and Delta points would have to pass through locks. At present, an average of about 570 deep-draft commercial vessels, and 10,300 tug and barge tows and small vessels pass Chipps Island each year. It is estimated the annual transits would increase to 2,800 and 40,000, respectively, by 2020. The volume of future military traffic cannot be realistically estimated, nor is it possible to place a reasonable value on its lost time. The increased tidal amplitude downstream from a barrier at Chipps Island would necessitate additional dredging in some areas to provide the required minimum navigation depth. This increased depth might cause additional maintenance dredging which frequently results from deepening navigation channels.

Completion of the Sacramento Deep Water Channel will divert most of the tug and barge traffic away from the Sacramento River between the vicinities of Rio Vista and Sacramento. The traffic which would pass the site of the Sacramento River control structure would generally be limited to that originating from or destined to points of call downstream from the vicinity of Freeport. It is anticipated that the volume of this traffic would increase from 600 transits per year after completion of the Sacramento Deep Water Channel to about 900 transits per year by 2020.



Construction of control structures and closures on channels south of the San Joaquin River in the heart of the Delta would increase time and distance for tug and barge travel to a sugar refinery near Tracy. However, channel improvements would permit use of larger barges, if shipping concerns should elect to do so. As this advantage would be subject to many factors in an operator's business which cannot be readily predicted, benefits were not claimed for possible use of larger barges.

Construction of a master levee system would necessitate relocation of some sugar beet loading docks in the Delta. However, improved roads would tend to compensate for increased hauls to relocated docks.

Economic Aspects—benefits, detriments, and costs

Only direct, tangible benefits and detriments to the initial recipient were evaluated for comparison with direct costs. However, it must be recognized that direct, intangible benefits and detriments would also result from project operation. The ratios of benefits to costs provide a guide to project selection, but consideration should also be given to the net benefits in making the final project selection. Although variations in benefit-cost ratios can result from different basic economic premises, the relative comparison of alternative projects would not change.

Certain significant benefits and detriments were not evaluated. All alternative plans would improve the quality of water exported to the San Joaquin Valley and reduce the drainage problems there. Only direct benefits of flood protection to agriculture were evaluated, but this protection would also benefit principal highways and urban developments. The estimated recreation benefits from land made available for development were considered to be equivalent to the value of the land. Intangible benefits would also accrue to recreation, and intangible detriments would result from reduced convenience of access into some channels. Only detriments to commercial fishing are shown, but intangible detriments to sport fishing would also accrue.

All estimates of benefits, detriments, and costs, including amortization, operation, and maintenance, reflect annual equivalent values for the period 1960-2020. An interest rate of four percent per annum was used in the analysis.

Attention is invited to the net benefits of the Comprehensive Delta Water Project which are less than the net benefits of the Typical Alternative Delta Water Project. This condition results from inclusion of economically unjustified flood control for large

areas south of the San Joaquin River wherein the direct benefits would be less than the costs. However, flood control for some of the critical areas south of the San Joaquin River warrants further study.

ESTIMATED ANNUAL BENEFITS, DETRIMENTS, AND COSTS (In thousands of dollars)				
Item	Chippa Island Barrier Project	Single Purpose Delta Water Project	Typical Alternative Delta Water Project	Compre- hensive Delta Water Project
Benefits				
Water salvage (for export)	8,337	8,963	8,963	8,963
Improved water quality— municipal, industrial, and irrigation	880	880	880	880
Supplemental municipal and industrial water supply	503	1,343	1,343	1,343
Flood and seepage control	—	—	530	1,022
Vehicular transportation	—	—	410	734
Recreation	—	19	37	58
Total Benefits	9,720	11,205	12,163	13,000
Detriments				
Commercial navigation	617	18	24	27
Commercial fisheries	844	203	254	287
Total Detriments	1,461	221	278	314
BENEFITS MINUS DETRIMENTS	8,259	10,984	11,885	12,686
Costs				
Capital amortization	6,825	1,358	1,965	2,846
Annual operation and maintenance	2,077	691	884	1,136
Total Costs	8,902	2,049	2,849	3,982
NET BENEFITS	-643	8,935	9,036	8,704
BENEFIT-COST RATIO	0.93:1	5.36:1	4.17:1	3.19:1

Economic Aspects—allocation of costs

The capital and operational costs of each of the alternative projects were allocated among the project functions by the Separable Costs-Remaining Benefits method. In this method, all costs assignable to single functions are identified, and the remaining multipurpose costs are distributed among the functions in proportion to the benefits provided by the project, or in proportion to the lowest cost alternative means of providing equivalent benefits. The lowest value of either the benefits or alternative means is used as a limit.

The basic allocations were made in terms of present worth values (1960) of all costs and benefits. This procedure properly

accounts for the time-value of money (interest) and the wide variation in dates of expenditure of money and realization of benefits. Allocations of the capital and operational costs in terms of actual expenditures, rather than present worth, are indicated in the accompanying tabulations to permit convenient comparisons with total amounts of these costs.

Attention is invited to the allocated costs of the Chipps Island Barrier Project. The costs which would be allocated to water salvage and western Delta water supply were limited by the lowest cost alternative means of providing equivalent benefits, which would be the Single Purpose Delta Water Project. The values

ALLOCATION OF ESTIMATED CAPITAL COSTS (in thousands)				
Item	Chipps Island Barrier Project	Single Purpose Delta Water Project	Typical Alternative Delta Water Project	Compre- hensive Delta Water Project
Water salvage (for export).....	\$38,384	\$38,444	\$38,662	\$41,655
Western Delta water supply ¹	8,098	8,111	8,156	8,788
Flood and seepage control	none	none	11,900	25,159
Vehicular transportation	none	none	8,132	18,083
Recreation land	none	none	681	1,429
Unassigned local costs	155,490	none	none	2,945
TOTALS	\$201,972	\$46,555	\$67,531	\$98,059

¹ For improvement in quality and supplemental water supplies. Allocated costs include portions properly attributable to upstream water users for future effects on the western Delta area due to increased water use in areas tributary to the Delta. Definite values attributable to upstream water users would be dependent upon resolution, negotiated or otherwise, of water rights problems.

shown for the Chipps Island Barrier Project are slightly less than those for the lowest cost alternative, since the funds for the former would be expended at an earlier date. The allocations to both projects in present worth values would be the same. As the costs which may be properly allocated to water salvage and western Delta water supply are less than the total cost, a portion of the costs of the Chipps Island Barrier Project are shown as unassigned local costs. If these costs are not repaid from sources other than water users, the Chipps Island Barrier Project would be financially infeasible.

Attention is also invited to the allocated costs of the Comprehensive Delta Water Project which indicate certain unassigned local costs. In this case the costs of flood and seepage control in areas south of the San Joaquin River exceed the direct benefits of flood and seepage control in these areas. Therefore, the allocation to flood and seepage control for these areas was limited to the benefits. These flood and seepage control features of the Comprehensive Delta Water Project are not economically justified.

After the costs were allocated to principal project functions, it was necessary to make suballocations among particular groups of beneficiaries. These suballocations, which are indicated on the following pages, were also made by the Separable Costs-Remaining Benefits method and were the basis for computing the average annual costs to beneficiaries throughout a 60-year period. In the adjoining tabulations the amounts allocated to vehicular transportation include some costs which would be suballocated to recreation access to reflect the benefits to the public for improved access to recreation areas of the Delta. It is estimated that about \$7,075,000 of the capital costs and \$92,000 of the annual operational costs for vehicular transportation under the Typical Alternative Delta Water Project would be suballocated to recreation access. Under the Comprehensive Delta Water Project these respective amounts would be \$15,123,000 and \$176,000. These foregoing amounts would be in addition to the basic allocation to recreation land, which reflects the value of lands made available for recreational development.

ALLOCATION OF ESTIMATED AVERAGE ANNUAL OPERATIONAL COSTS (In thousands)				
Item	Chipps Island Barrier Project	Single Purpose Delta Water Project	Typical Alternative Delta Water Project	Compre- hensive Delta Water Project
Water salvage (for export).....	\$395	\$571	\$506	\$483
Western Delta water supply ¹	83	120	107	102
Flood and seepage control.....	none	none	156	292
Vehicular transportation.....	none	none	106	210
Recreation land.....	none	none	9	16
Unassigned local costs.....	1,599	none	none	34
TOTALS	\$2,077	\$691	\$884	\$1,137

¹ For improvement in quality and supplemental water supplies. Allocated costs include portions properly attributable to upstream water users for future effects on the western Delta area due to increased water use in areas tributary to the Delta. Definite values attributable to upstream water users would be dependent upon resolution, negotiated or otherwise, of water rights problems.

Economic Aspects—costs of project services

It was assumed that all project costs not specifically declared nonreimbursable would be repaid by all beneficiaries of project functions. In accordance with the contracting principles established for water service under the State Water Resources Development System, the conservation features of the Delta water facilities will be financially integrated with other conservation features of the system. The cost of supplemental water required by Delta water users will include the Delta Water Charge and an allocated transportation charge.

Estimates of present and future costs of water supply in the western Delta area were predicated on continuation of current federal salinity control policy, which limits the minimum regulated outflow from the Delta to 1,500 second-feet, considered necessary to afford satisfactory quality control at the Central Valley Project pumping plants. Estimates of increased future costs without the State Water Facilities reflect continued upstream depletion of surplus water in the Delta, and represent average costs during the next 60 years. Estimates of costs shown for project conditions also reflect average costs during the next 60 years. It is empha-

sized that the estimates are comparative average annual *costs* during a 60-year period and do not reflect estimates of year by year *prices* which may be established.

The amounts allocated for repayment were limited by the lowest cost alternative means of accomplishing equivalent benefits. It may be noted that the costs of water supply in the western Delta area would be the same for the Chipps Island Barrier Project,

Single Purpose Delta Water Project, and Comprehensive Delta Water Project. The Single Purpose Delta Water Project would be the lowest cost alternative means of providing water supplies and it limits the amount which may be allocated under the other two projects.

The costs of the Typical Alternative Delta Water Project allocated to water salvage would amount to an average of \$0.64

COMPARATIVE SUMMARY OF ESTIMATED AVERAGE ANNUAL COSTS OF
WATER SUPPLY IN WESTERN DELTA AREA WITH AND WITHOUT
STATE WATER FACILITIES DURING 1960-2020¹

Item	Future cost without State Water Facilities	Chipps Island Barrier Project	Single Purpose Delta Water Project	Typical Alternative Delta Water Project	Compre- hensive Delta Water Project
Contra Costa Canal service, \$/acre-foot ²	14.52 ³	11.66	11.66	11.64	11.66
Substitute municipal and industrial water supply, \$/acre-foot	4	4	3.45	3.33	3.45
Supplemental water supply ⁴					
Contra Costa County, \$/acre-foot.....	15.20	9.06	9.06	8.92	9.06
Solano County, \$/acre-foot.....	17.00	8.82	8.82	8.68	8.82
Agricultural water supply, \$/acre ⁵	7.91 ⁶	1.50	1.50	1.45	1.50

¹ Average of estimated costs during a 60-year period. Values do not necessarily reflect *prices* for project services.

² For all municipal and industrial water served from the Contra Costa Canal. All costs include \$11 per acre-foot for water from the canal. Allocated costs reflect benefits from improved quality.

³ Includes estimated excess water treatment due to salinity degradation.

⁴ Estimated future cost of high quality water from Delta channels will vary between \$2.00 and \$5.00 per acre-foot, depending upon plant locations and operations.

⁵ All supplemental project water available through operation of the Montezuma Aqueduct.

⁶ Costs reflect average for about 34,000 acres in the western Delta lowlands.

⁷ Cost expressed as loss per acre due to salinity incursion.

per acre-foot for all water exported from the Delta by the State Water Facilities. Similar costs with the other projects would be about \$0.66 per acre-foot.

It is anticipated that a federal contribution would be provided for flood and seepage control. This contribution, tentatively estimated at \$10,123,000 for the Typical Alternative Delta Water Project and \$16,020,000 for the Comprehensive Delta Water Project, would probably reflect current federal policy for allocation of costs of levee improvements, and would be based on reduced flood damages and net savings from reduced levee maintenance costs. Local costs of maintaining existing levees incorporated in the master levee system probably would not be directly met by local districts. Maintenance would be included in the total project costs, and a portion of these costs would be allocated to local beneficiaries.

The total project costs allocated to vehicular transportation were suballocated to the benefited counties and to the general public. The allocation to the general public reflects enhancement of recreation, and was considered nonreimbursable.

**COMPARATIVE SUMMARY OF ESTIMATED ANNUAL COSTS OF
FLOOD AND SEEPAGE CONTROL WITH AND WITHOUT
DELTA WATER FACILITIES DURING 1960-2020¹**

(Per acre)

Item	Island-group					
	Isleton	Lodi	Holt	Tracy	Brentwood	Sherman
Present control cost	\$8.00	\$8.00	\$7.50	\$6.50	\$7.50	\$9.00
Future control cost without a project	10.85	10.29	9.16	7.50	8.83	13.10
Annual damage savings with a project	2.80	1.65	0.35	0.20	1.32	3.12
Typical Alternative Delta Water Project						
Allocated project cost	2.04	2.17				
Interior levees and pumping cost	7.96	7.34				
Total control cost	\$10.00	\$9.51				
Net savings	3.65	2.43				
Comprehensive Delta Water Project						
Allocated project cost	2.15	2.29	2.09	2.29	2.38	2.53
Interior levees and pumping cost	7.96	7.34	6.66	4.97	6.04	10.57
Total control cost	\$10.11	\$9.63	\$8.75	\$7.26	\$8.42	\$13.10
Net savings	3.54	2.31	0.76	0.44	1.73	3.12

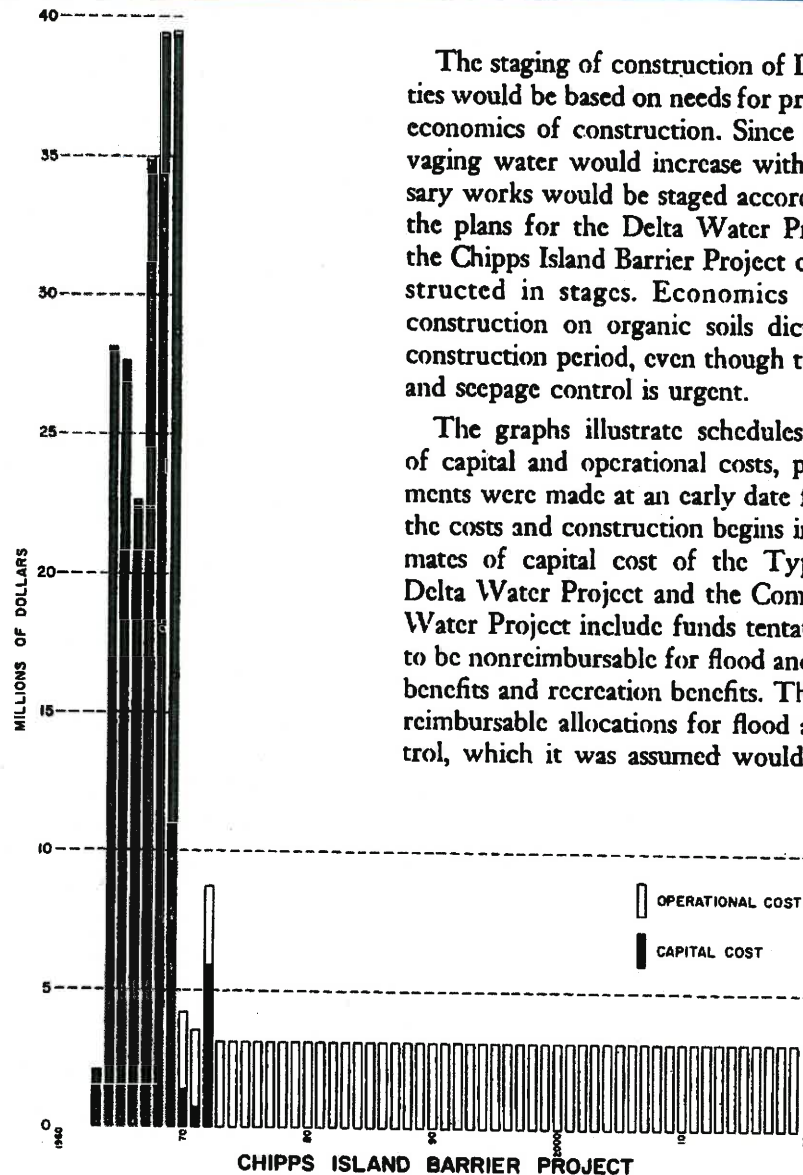
¹ Average of estimated costs during a 60-year period. Values do not necessarily reflect prices for project services.

**COMPARATIVE SUMMARY OF ESTIMATED ANNUAL COSTS AND SAVINGS
WITH VEHICULAR TRANSPORTATION IMPROVEMENTS DURING 1960-2020¹**

Item	Contra Costa County	San Joaquin County	Sacramento County
Typical Alternative Delta Water Project			
Allocated project cost	\$ —	\$41,400	\$4,500
Operational savings to present road system	—	38,500	1,100
Savings to road users	—	265,700	105,200
Net savings	—	268,800	101,800
Comprehensive Delta Water Project			
Allocated project cost	13,300	95,700	11,200
Operational savings to present road system	2,900	59,300	5,000
Savings to road users	82,000	465,600	119,700
Net savings	71,600	429,200	113,500

¹ Average of estimated costs during a 60-year period. Values do not necessarily reflect prices for project services.
NOTE: There would not be any vehicular transportation improvements in portions of other counties within the Delta.

Economic Aspects—repayment

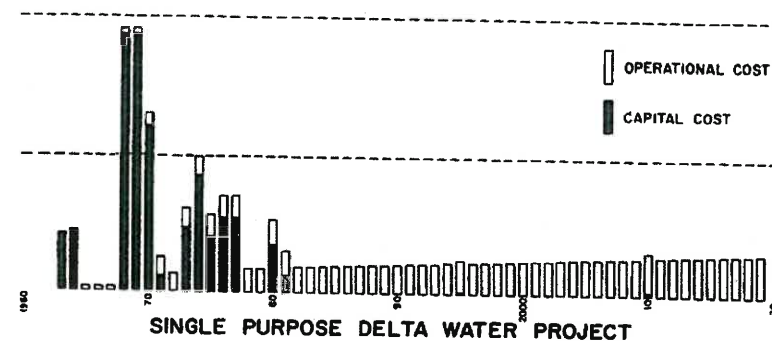


The staging of construction of Delta water facilities would be based on needs for project services and economics of construction. Since the need for salvaging water would increase with time, the necessary works would be staged accordingly for any of the plans for the Delta Water Project. However, the Chipps Island Barrier Project could not be constructed in stages. Economics of master levee construction on organic soils dictate an extended construction period, even though the need for flood and seepage control is urgent.

The graphs illustrate schedules of expenditures of capital and operational costs, provided arrangements were made at an early date for repayment of the costs and construction begins in 1963. The estimates of capital cost of the Typical Alternative Delta Water Project and the Comprehensive Delta Water Project include funds tentatively considered to be nonreimbursable for flood and seepage control benefits and recreation benefits. The estimated nonreimbursable allocations for flood and seepage control, which it was assumed would be provided by

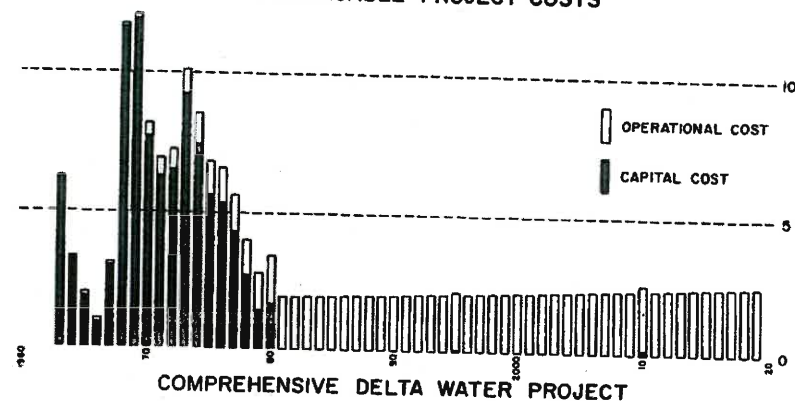
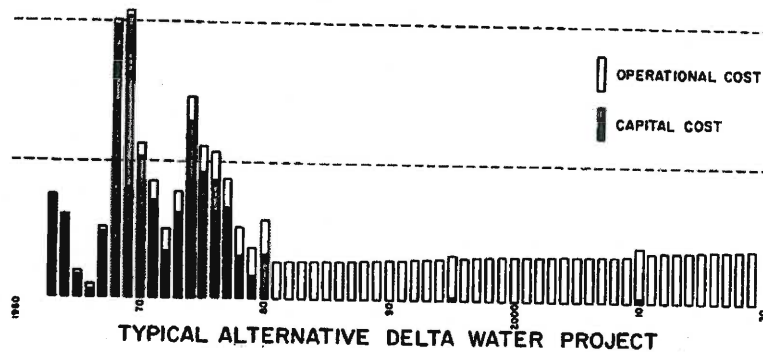
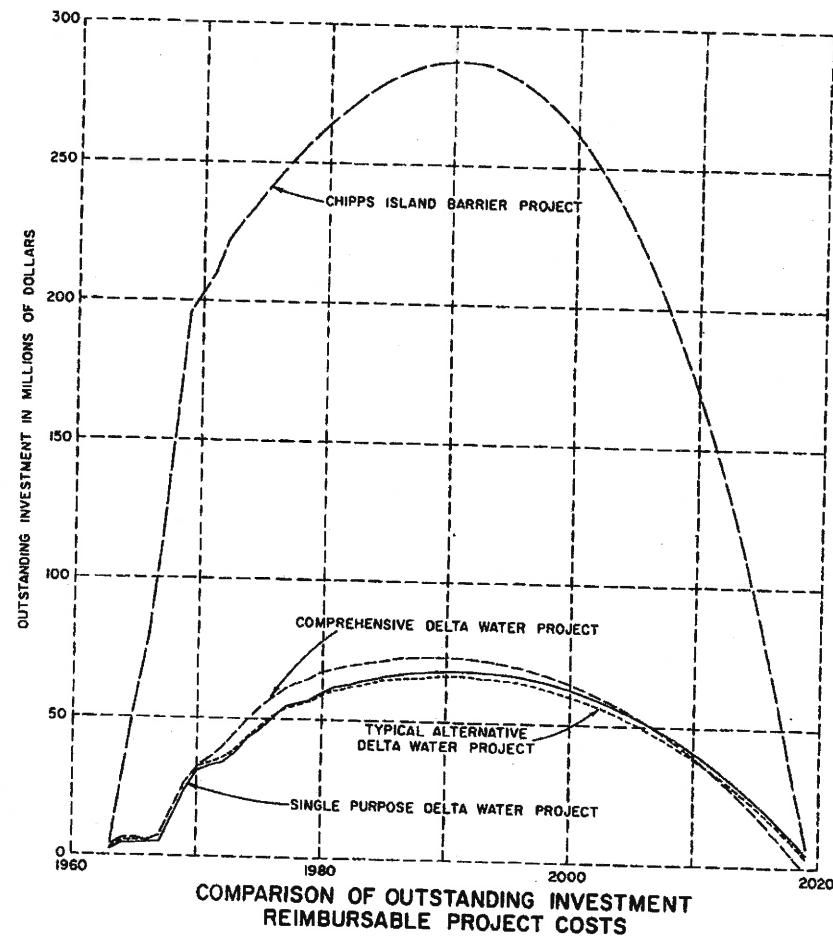
the Federal Government, amount to about \$10,123,000 for the Typical Alternative Delta Water Project and \$16,020,000 for the Comprehensive Delta Water Project. The estimated allocation of capital costs to recreation land and access would be \$7,756,000 with the Typical Alternative Delta Water Project and \$16,552,000 with the Comprehensive Delta Water Project. The corresponding allocations of annual operational costs would be \$101,000 and \$192,000, respectively. It was assumed that the allocated capital costs for recreation land and access would be nonreimbursable and be borne by the State of California. It was also assumed that the annual operational costs would be reimbursable from gas tax funds and nominal rental charges on land made available for recreation development.

The allocated reimbursable costs for water salvage and western Delta water supply would be repaid by water charges. The charges would be based on integrated repayment of other necessary State Water Facilities. The reimbursable costs of flood



and seepage control and vehicular transportation improvements would be repaid by annual payments from the beneficiaries of flood and seepage control and from the counties, respectively. It was assumed that unassigned local costs of the Chipps Island Barrier Project would be recovered in annual payments in proportion to the projected industrial tax base. This assumed method of repayment would necessitate a rate of about \$1.19 per \$100 of assessed valuation throughout a 60-year period. It was also assumed that unassigned local costs of the Comprehensive Delta Water Project would be recovered in annual payments based upon the total acreage of land south of the San Joaquin River which would benefit from flood and seepage control. An annual payment of \$0.86 per acre would be required.

The comparative investment requirements for allocated reimbursable costs, including interest and operational costs, of the several projects are shown in the accompanying graph.



Conclusions and Recommendations

CONCLUSIONS

GENERAL

The plans for Delta water facilities described in this report are consistent with and would accomplish the water development purposes embraced in the California Water Resources Development Bond Act approved on November 8, 1960. Additional features could be incorporated to provide flood and seepage control, transportation, and recreation benefits.

WATER SUPPLY

Problems of water quality in the western portion of the Delta necessitate early construction of facilities to provide suitable water supplies for present and future uses.

WATER SALVAGE

Without physical control works in the Delta, increasingly greater quantities of fresh water from upstream storage will be required to repel ocean salinity and maintain good quality water for use within and export from the Delta. Water salvage will be dependent upon coordinated operation of regulatory storage, export works, and Delta water facilities.

FLOOD AND SEEPAGE CONTROL

The magnitude of flood damage and the costs of flood and seepage control will become increasingly greater as the land surface of many Delta islands continues to subside. A master levee system would reduce these costs. Early initiation of construction is necessary to economically provide stable levees.

VEHICULAR TRANSPORTATION AND RECREATION

Improvements to the road system in the Delta are needed to reduce costs of vehicular shipment and to develop the recreation potential to accommodate an estimated 7,000,000 recreation-days in 1990, and 14,000,000 recreation-days in 2020.

DELTA WATER FACILITIES

1. The Chipps Island Barrier Project would be functionally feasible, would provide adequate water supplies of acceptable quality for the Delta, and would salvage water otherwise needed for salinity control amounting to an estimated annual average of 1,900,000 acre-feet based on a 60-year period. However, the net benefits would be less than the project costs in a ratio of 0.93:1. Therefore, the project would not be economically justified. The project would not be financially feasible, unless revenues could be obtained from local taxes in addition to revenues derived from water sales.

2. The alternative plans of the Delta Water Project would be functionally feasible, would permit export of full water demands on the State Water Facilities, and would provide adequate water supplies, both in quality and quantity, for the Delta. The project would salvage water otherwise needed for salinity control amounting to an estimated annual average of 2,050,000 acre-feet based on a 60-year period.

3. The Chipps Island Barrier Project would probably cause disastrous reductions in the fisheries resource of the Delta. The Single Purpose Delta Water Project would be the least detrimental of all projects and would reduce some losses of fish and

Advanced Planning, Design, and Operation Studies

It is anticipated that the results of the planning studies summarized in this bulletin and described in detail in the supporting office reports will be the basis for selection of a general plan for the Delta Water Project. However, it is recognized that definite plans, designs, and operation programs will be dependent upon further studies and negotiations on certain aspects of the project plans.

LOCAL ACTION

Early consideration should be given by local agencies to the extent of their interest in facilities which could be constructed to provide local benefits. Acute water supply problems in the western Delta, particularly in the agricultural lowlands, warrant early resolution of interest in plans for water supply facilities. Consideration should be given to creation of master districts to represent related areas of interest in flood and seepage control benefits.

UNITED STATES CORPS OF ENGINEERS

Studies for flood and seepage control benefits and estimates of the federal contribution were based on methods and preliminary studies of the Corps of Engineers. Conditions in the Delta do not precisely fit standard procedures, and it will be necessary for the Corps of Engineers to make a detailed review of these studies to determine the extent of federal interest.

UNITED STATES BUREAU OF RECLAMATION

The Delta Water Project would enhance the operation of the Federal Central Valley Project by improving and insuring the quality of water exported from the Delta and by providing good quality water in the western Delta area in lieu of salinity control. The extent of federal interest in these benefits should be jointly analyzed by the Bureau of Reclamation and the Department of Water Resources.

HIGHWAYS

The channel closures and wide landward berms of the master levee system offer excellent opportunities for enhancing the road network in the Delta. Studies should be made by the State Division of Highways and county highway departments of transportation enhancement features, such as better road surfacing and connecting roads, which might be incorporated in the project plans.

FISHERY RESOURCES

To more definitely predict the anticipated project effects on fisheries and to design the fish screens and other remedial measures, it will be necessary to study certain biological aspects of the Delta fisheries. Joint studies of the anticipated project effects should be undertaken by the Department of Fish and Game and the Department of Water Resources.

OTHER STUDIES

Advance planning studies of flow distribution, salinity incursion, water quality, and sedimentation should continue throughout the design and early operation phases of project construction.

Test levee construction now being conducted pursuant to legislative directives will be continued to determine the most economical and efficient means of construction to provide an adequate levee system.

A general plan for remedial recreation facilities and recreation enhancement has been developed. Specific plans for facilities and development of land which can be made available for recreation uses should be prepared by county agencies, the Department of Water Resources, and other appropriate state agencies.

Acknowledgments

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Inglewood, California

COOPERATIVE STUDIES

U. S. Corps of Engineers
Sacramento District—flood control and navigation aspects
San Francisco District—preliminary designs, Chippa Island Barrier Project

U. S. Coast and Geodetic Survey—subsidence surveying

California Department of Fish and Game—fish and game studies

Contra Costa County Water Agency—industrial water use studies

University of California
Berkeley—electric analog model of Delta channels
Davis—organic soil salination research

Stanford University—salinity incursion analyses

Persens, Brinckerhoff, Hall and Macdonald—recreation studies

WESTERN DELTA ADVISORY COMMITTEE

A special Western Delta Advisory Committee was established at the suggestion of the Director of Water Resources to advise the department, primarily on studies of water requirements and plans in the western Delta. Committee membership, which has not endorsed all aspects of this report, included:

Contra Costa County

W. G. Buchanan, Chairman
Thomas M. Carlson
William J. O'Connell

San Joaquin County

L. H. Bradley
Clifford B. Bull, Vice-Chairman
Richard G. Salter

U. S. Bureau of Reclamation

Richard J. Shukle

Sacramento County

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**Table 3. Sacramento River Multiyear Droughts
(reconstructed from tree rings prior to 1900)**

Period	Length (in years)	Average Runoff (MAF)
1579-82	4	12.4
1593-95	3	9.3
1618-20	3	13.2
1651-55	5	12.3
1719-24	6	12.6
1735-37	3	12.2
1755-61	6	13.3
1776-78	3	12.1
1793-95	3	10.7
1839-41	3	12.9
1843-46	4	12.3
1918-20 (actual)	3	12.0
1929-34 (actual)	6	9.8
1959-62 (actual)	4	13.0
1987-92 (actual)	6	10.0



CALIFORNIA DEPARTMENT OF WATER RESOURCES

NEWS FOR IMMEDIATE RELEASE

NEWS FOR IMMEDIATE RELEASE

March 10, 2014

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Severity of Past Droughts Quantified by New Streamflow Reconstructions

SACRAMENTO – As part of ongoing work to improve California's drought preparedness and better adapt to climate change, the Department of Water Resources (DWR) today released a report examining tree-ring data to help better understand historic periods of drought. The report helps develop long-term reconstructions of streamflow or precipitation for the Klamath, Sacramento, and San Joaquin river basins. The report, prepared for DWR by researchers at the University of Arizona, is available [here](#). Funding for part of the Klamath Basin work was provided by the U.S. Bureau of Reclamation under its WaterSMART program.

Initial work on the reconstruction project began in 2010, at a time when California was just emerging from the 2007-09 drought. Completion of the final report coincides with a new three-year drought and a Water Year 2014 that so far is one of the driest years in the historical record.

California's roughly one hundred years of observed data are, however, only a small subset of the hydrologic record that can be reconstructed by measuring tree rings and calibrating them to observed data. The tree-ring measurements made for this project allowed development of reconstructions that begin in the year 900 for the Sacramento River and San Joaquin River systems, and in the 1500s for various sites in the Klamath Basin.

"Streamflow reconstruction from tree rings takes advantage of the great longevity and climate sensitivity of several tree species in California and Oregon," said lead author David Meko, a University of Arizona research professor of dendrochronology. "The tree-ring patterns record unusual climate events and modes of variability that occurred before the short period of gaged streamflow."

Drought is a recurring part of California's climate. The report's reconstructions show numerous periods of four or more years when streamflows were below median conditions.

In addition, the report reveals that all three river basins share common major periods of extreme low flow conditions, although the degree of severity varies from river to river. The most severe shared periods were the 1100s (20 – 50 year sustained dry periods), 1570 to early 1580s (up to decades-long periods), and 1920s -1930s (up to 20-year periods). The Sacramento and San Joaquin basins shared 1580 as the single driest year of record. The driest single year for Klamath River streamflow was 1655 (1580 was 17th driest). The graphic below illustrates notable low-flow periods in the river basins. A tabulation listing all dry periods of four or more years is attached.

Paleoclimate information such as these reconstructed streamflows captures a broader range of hydrologic variability than provided in the historical record, thereby putting our short period of observed droughts in perspective.

A repeat of the "Dustbowl Drought" of the 1920s and 1930s (our most severe historical event in terms of duration) with today's urban and agricultural development would sorely challenge California's infrastructure and institutional framework for water management. That challenge would pale in comparison to the time of the Medieval Climate Anomaly, when sustained severe drought gripped much of the western United States.

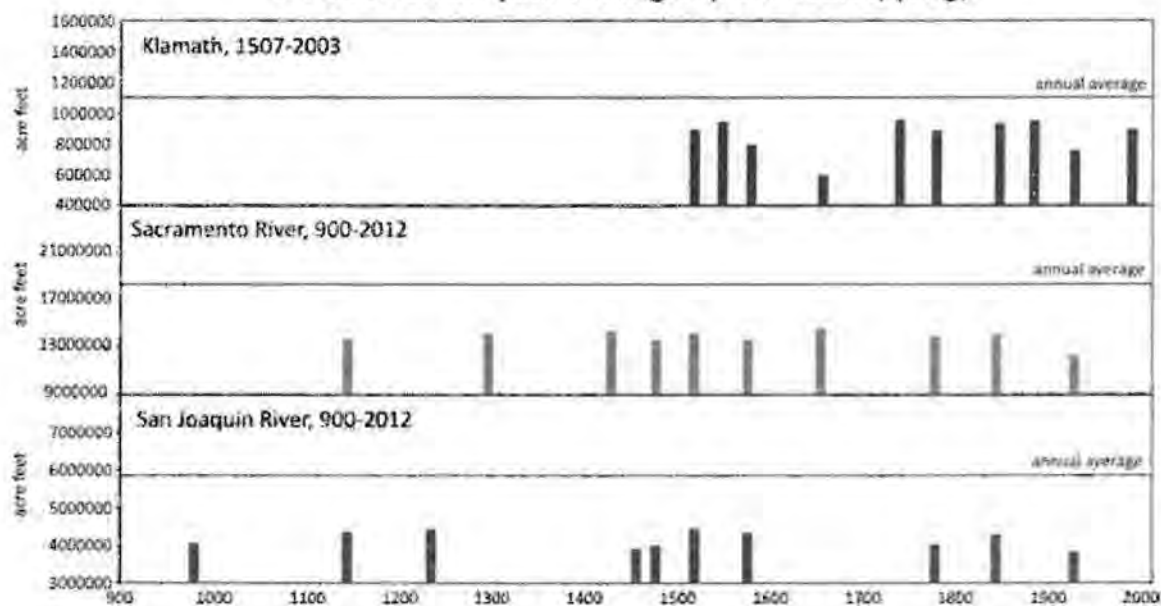
Paleoclimate information is useful in helping to understand and model natural variability in the climate system that may provide clues for improving drought prediction at the seasonal time scales important for water management.

Jeanine Jones of DWR said, "Drought prediction skillful enough to use for water management decision-making remains a research challenge for the science community. Having improved climate forecasting capabilities at time scales of months to a year in advance would provide great benefit for drought preparedness."

Looking into the future, the reconstructions also help provide context for expected impacts of climate change. The report compares drought durations seen in the paleoclimate record with those projected by downscaled global climate change models run to simulate conditions by the end of the century. The results indicate that the paleoclimate data may be useful for assessing future climate projections in the context of past centuries.

Report co-author Connie Woodhouse, professor and interim head of the University of Arizona School of Geography and Development, said, "These tree-ring records document the range of drought characteristics, including duration, that have occurred in the past, under natural climate variability. These droughts could occur in the future, but under warmer temperatures that will further exacerbate their impacts."

Lowest ten 10-year averages (non-overlapping)



Klamath = Klamath River at Keno

Sacramento River = Sacramento River runoff

San Joaquin River = San Joaquin River runoff

Sacramento River runoff is the sum of unimpaired flow in million acre-feet at:
Sacramento River above Bend Bridge

Feather River at Oroville (aka inflow to Lake Oroville)
Yuba River near Smartville

American River below Folsom Lake

San Joaquin River Runoff is the sum of unimpaired flow in million acre-feet at:

Stanislaus River below Goodwin Reservoir (aka inflow to New Melones Res.)

Tuolumne River below La Grange (aka inflow to New Don Pedro Reservoir)

Merced River below Merced Falls (aka inflow to Lake McClure)

San Joaquin River inflow to Millerton Lake

Runs^a with length ≥ 4 years in three flow reconstructions

Klamath ^b		Sacramento ^{4c}		San Joaquin ^{4d}	
Years	N	Years	N	Years	N
1515-1522	8	921- 924	4	946- 950	5
1540-1543	4	945- 950	6	977- 981	5
1547-1552	6	975- 981	7	1072-1075	4
1578-1582	5	1072-1075	4	1143-1148	6
1592-1597	6	1130-1136	7	1155-1158	4
1642-1646	5	1143-1148	6	1172-1177	6
1648-1668	21	1150-1158	9	1210-1213	4
1738-1744	7	1170-1177	8	1233-1239	7
1756-1761	6	1233-1239	7	1294-1301	8
1764-1767	4	1292-1301	10	1395-1402	8
1775-1779	5	1390-1393	4	1407-1410	4
1783-1787	5	1395-1400	6	1425-1428	4
1792-1798	7	1407-1410	4	1450-1461	12
1843-1846	4	1425-1432	8	1463-1466	4
1848-1852	5	1451-1457	7	1471-1483	13
1873-1876	4	1475-1483	9	1505-1508	4
1880-1884	5	1515-1521	7	1518-1523	6
1912-1915	4	1540-1543	4	1540-1545	6
1917-1920	4	1569-1572	4	1569-1572	4
1924-1935	12	1578-1582	5	1578-1582	5
1987-1992	6	1592-1595	4	1592-1595	4
		1636-1639	4	1629-1632	4
		1645-1648	4	1645-1648	4
		1652-1655	4	1652-1655	4
		1753-1760	8	1688-1691	4
		1780-1783	4	1753-1757	5
		1843-1846	4	1780-1783	4
		1856-1859	4	1793-1796	4
		1917-1922	6	1843-1846	4
		1926-1935	10	1855-1859	5
		1946-1951	6	1928-1931	4
		1959-1962	4	1946-1950	5
		1987-1992	6	1959-1962	4
				1987-1992	6
				2000-2004	5

- a runs defined as consecutive years below median
- b Klamath River at Keno, 1507-2003; median =1113 thousand acre-feet (TAF)
- c Sacramento River runoff, 900-2012, median=17800 TAF
- d San Joaquin River runoff, 900-2012, median=5598 TAF

With California facing one of the most severe droughts on record, Governor Brown declared a drought State of Emergency and directed state officials to take all necessary actions to prepare for water shortages. The Governor signed legislation to immediately help communities deal with the devastating dry conditions affecting our state and to provide funding to increase local water supplies after it was passed with bipartisan support in the legislature.

Governor Brown met with President Obama about crucial federal support during the ongoing drought, and the state continues to work with federal partners to ensure coordinated drought monitoring and response. Governor Brown and the administration have also expressed support for federal legislation introduced by Senators Feinstein and Boxer and Representatives Jim Costa, Tony Cárdenas and Sam Farr.

Across state government, action is being taken. The Department of General Services is leading water conservation efforts at state facilities, and the California State Architect has asked California school districts and Community Colleges to act on the Governor's call to reduce water usage. The Department of Transportation is cutting water usage along California's roadways by 50 percent. Caltrans has also launched a public awareness campaign, putting a water conservation message on their more than 700 electronic highway signs.

In January, the state took action to conserve water in numerous Northern California reservoirs to meet minimum needs for operations impacting the environment and the economy, and recently the Department of Water Resources and U.S. Bureau of Reclamation announced they would seek the authority to make water exchanges to deliver water to those who need it most. The State Water Resources Control Board announced it would work with hydropower generators and the Federal Energy Regulatory Commission to preserve water in California reservoirs, and the California Department of Fish and Wildlife and the California Fish and Game Commission restricted fishing on some waterways due to low water flows worsened by the drought.

The state is working to protect local communities from the dangers of extreme drought. The California Department of Public Health identified and offered assistance to communities at risk of severe drinking water shortages and is working with other state and local agencies to develop solutions for vulnerable communities. CAL FIRE hired additional firefighters and is continuously adjusting staffing throughout the state to help address the increased fire threat due to drought conditions. The California Department of Food and Agriculture launched a drought website to help farmers, ranchers and farmworkers find resources and assistance programs that may be available to them during the drought.

Even as the state deals with the immediate impacts of the drought, it's also planning for the future. In 2013, the California Natural Resources Agency, the California Environmental Protection Agency and CDFA released the California Water Action Plan, which will guide state efforts to enhance water supply reliability, restore damaged and destroyed ecosystems and improve the resilience of our infrastructure.

Governor Brown has called on all Californians to voluntarily reduce their water usage by 20 percent, and the Save Our Water campaign launched four public service announcements encouraging residents to conserve and has resources available in Spanish. Last December, the Governor formed a Drought Task Force to review expected water allocations and California's preparedness for water scarcity. In May 2013, Governor Brown issued an Executive Order to direct state water officials to expedite the review and processing of voluntary transfers of water.



– 30 –

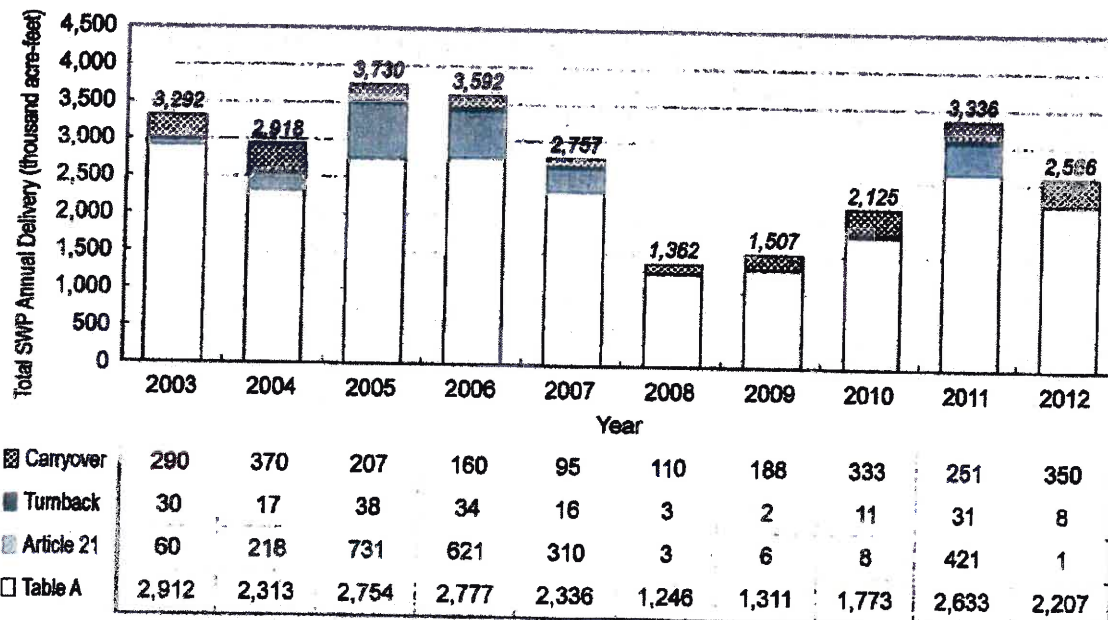
The Department of Water Resources operates and maintains the State Water Project, provides dam safety and flood control and inspection services, assists local water districts in water management and water conservation planning, and plans for future statewide water needs.

The State Water Project Delivery Reliability Report 2013



Note: The differences in historical deliveries from the State Water Project Delivery Reliability Report 2011 are due to reclassification of the various components of water delivered to SWP contractors.

Figure 2-3. Historical Deliveries of SWP Table A Water, 2003-2012



Note: The differences in historical deliveries from the State Water Project Delivery Reliability Report 2011 are due to reclassification of the various components of water delivered to SWP contractors.

Figure 2-4. Total Historical SWP Deliveries, 2003-2012 (by Delivery Type)

Dry-Year Deliveries of SWP Table A Water under Future Conditions

Table 6-3 and Figure 6-3 present estimates of future SWP Table A water deliveries during possible drought conditions and compare these estimates with the corresponding delivery estimates calculated for the 2011 Report.

Drought scenarios for future conditions are analyzed using the historical drought-period precipitation and runoff patterns from 1922–2003 as a reference, while accounting for future conditions (e.g., land use, climate change).

The results of modeling future conditions under potential drought-year scenarios provide an estimated range of Table A deliveries that can be expected during drought periods.

The 2-year drought period (1976–1977) shows significantly lower Table A deliveries in the 2013 Report than in the 2011 Report (see Figure 6-3), because of modeling refinements (see the technical addendum at <http://baydeltaoffice.water.ca.gov/>) and reclassification of 1975 into a wet year rather than an above-normal year, as was used in the 2011 Report (due to the change in the assumed climate change model). Because 1975 is now considered a wet year in this 2013 Report's model, there are higher fall X2 requirements to meet and more Delta outflow is required in September. This leads to lower reservoir levels at the start of the new water year and smaller deliveries during the upcoming 2-year dry period.

Table 6-3. Estimated Average and Dry-Period Deliveries of SWP Table A Water (Future Conditions, in tbf/year) and Percent of Maximum SWP Table A Amount, 4,133 tbf/year

	Long-term Average (1921–2003)		Single Dry Year (1977)		Dry Periods							
					2-Year Drought (1976–1977)		4-Year Drought (1931–1934)		6-Year Drought (1987–1992)		6-Year Drought (1929–1934)	
2011 Report	2,465	60%	441	11%	1,457	35%	1,401	34%	1,226	30%	1,365	33%
2013 Report	2,400	58%	453	11%	978	24%	1,263	31%	1,055	26%	1,251	30%

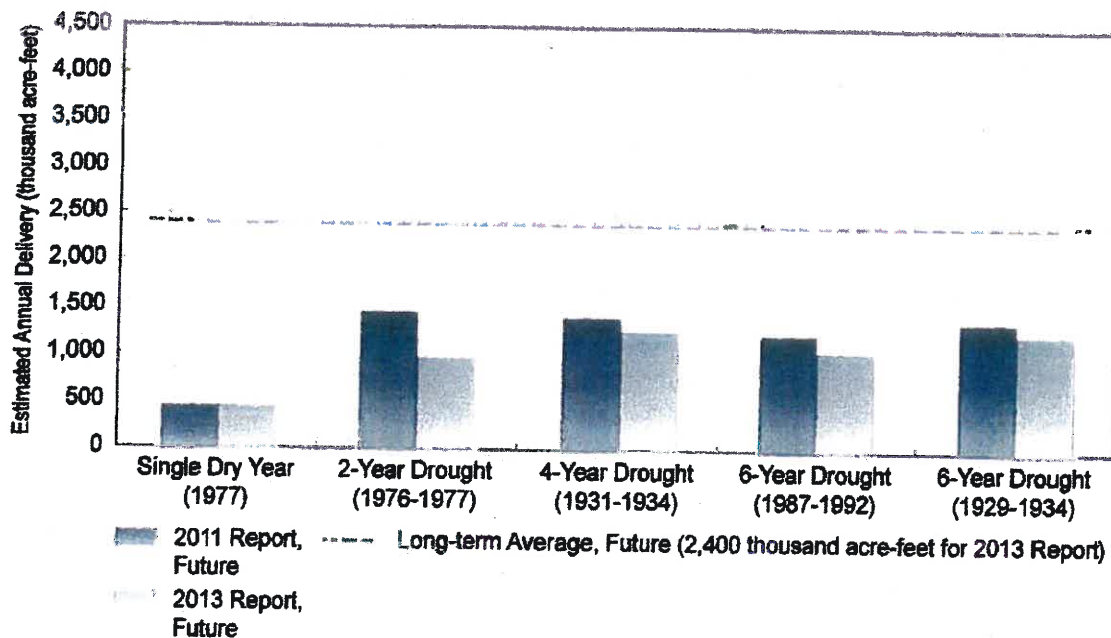


Figure 6-3. Estimated Dry-Period SWP Table A Water Deliveries (Future Conditions)

Title THE CALIFORNIA WATER RESOURCES DEVELOPMENT BOND ACT
Year/Election 1960 general
Proposition type bond (leg)
Popular vote Yes: 3,008,328 (51.5%); No: 2,834,384 (48.5%)
Pass/Fail Pass
Summary

This act provides for a bond issue of one billion, seven hundred fifty million dollars (\$1,750,000,000) to be used by the Department of Water Resources for the development of the water resources of the State.

For **Argument in Favor of California Water Resources Development Bond Act**

Your vote on this measure will decide whether California will continue to prosper.

This Act, if approved, will launch the statewide water development program which will meet present and future demands of all areas of California. The program will not be a burden on the taxpayer; no new state taxes are involved; the bonds are repaid from project revenues, through the sale of water and power. In other words, it will pay for itself. The bonds will be used over a period of many years and will involve an approximate annual expenditure averaging only \$75 million, as compared, for example with \$600 million a year we spend on highways.

Existing facilities for furnishing water for California's needs will soon be exhausted because of our rapid population growth and industrial and agricultural expansion. We now face a further critical loss in the Colorado River supply. Without the projects made possible by this Act, we face a major water crisis. We can stand no more delay.

If we fail to act now to provide new sources of water, land development in the great San Joaquin Valley will slow to a halt by 1965 and the return of cultivated areas to wasteland will begin. In southern California, the existing sources of water which have nourished its tremendous expansion will reach capacity by 1970 and further development must wholly cease. In northern California desperately needed flood control and water supplies for many local areas will be denied.

This Act will assure construction funds for new water development facilities to meet California's requirements now and in the future. No area will be deprived of water to meet the needs of another. Nor will any area be asked to pay for water delivered to another.

To meet questions which concerned, southern California, the bonds will finance completion of all facilities needed, as described in the Act. Contracts for delivery of water may not be altered by the Legislature. The tap will be open, and no amount of political maneuvering can shut it off.

Under this Act the water rights of northern California will remain securely protected. In addition, sufficient money is provided for construction of local projects to meet the pressing needs for flood control, recreation and water deliveries in the north.

A much needed drainage system and water supply will be provided in the San Joaquin Valley.

Construction here authorized will provide thousands of jobs. And the program will nourish tremendous industrial and farm and urban expansion which will develop an ever-growing source of employment and economic prosperity for Californians.

Our Legislature has appropriated millions of dollars for work in preparation, and construction is now underway. It would be tragic if this impressive start toward solution of our water problems were now abandoned.

If we fail to act now to insure completion of this constructive program, serious existing water shortages will only get worse. The success of our State is at stake. Vote "Yes" for water for people, for progress, for prosperity!

Public Law 86-488

June 3, 1960
[S. 44]

AN ACT

To authorize the Secretary of the Interior to construct the San Luis unit of the Central Valley project, California, to enter into an agreement with the State of California with respect to the construction and operation of such unit, and for other purposes.

Central Valley
Project, Calif.
San Luis unit.
Construction.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) for the principal purpose of furnishing water for the irrigation of approximately five hundred thousand acres of land in Merced, Fresno, and Kings Counties, California, hereinafter referred to as the Federal San Luis unit service area, and as incidents thereto of furnishing water for municipal and domestic use and providing recreation and fish and wildlife benefits, the Secretary of the Interior (hereinafter referred to as the Secretary) is authorized to construct, operate, and maintain the San Luis unit as an integral part of the Central Valley project. The principal engineering features of said unit shall be a dam and reservoir at or near the San Luis site, a forebay and afterbay, the San Luis Canal, the Pleasant Valley Canal, and necessary pumping plants, distribution systems, drains, channels, levees, flood works, and related facilities, but no facilities shall be constructed for electric transmission or distribution service which the Secretary determines, on the basis of an offer of a firm fifty-year contract from a local public or private agency, can through such contract be obtained at less cost to the Federal Government than by construction and operation of Government facilities. The works (hereinafter referred to as joint-use facilities) for joint use with the State of California (hereinafter referred to as the State) shall be the dam and reservoir at or near the San Luis site, forebay and afterbay, pumping plants, and the San Luis Canal. The joint-use facilities consisting of the dam and reservoir shall be constructed, and other joint-use facilities may be constructed, so as to permit future expansion; or the joint-use facilities shall be constructed initially to the capacities necessary to serve both the Federal San Luis unit service area and the State's service area, as hereinafter provided. In constructing, operating, and maintaining the San Luis unit, the Secretary shall be governed by the Federal reclamation laws (Act of June 17, 1902 (32 Stat. 388), and Acts amendatory thereof or supplementary thereto). Construction of the San Luis unit shall not be commenced until the Secretary has (1) secured, or has satisfactory assurance of his ability to secure, all rights to the use of water which are necessary to carry out the purposes of the unit and the terms and conditions of this Act, and (2) received satisfactory assurance from the State of California that it will make provision for a master drainage outlet and disposal channel for the San Joaquin Valley, as generally outlined in the California water plan, Bulletin Numbered 3, of the California Department of Water Resources, which will adequately serve, by connection therewith, the drainage system for the San Luis unit or has made provision for constructing the San Luis interceptor drain to the delta designed to meet the drainage requirements of the San Luis unit as generally outlined in the report of the Department of the Interior, entitled "San Luis Unit, Central Valley Project," dated December 17, 1956.

(b) No water provided by the Federal San Luis unit shall be delivered in the Federal San Luis service area to any water user for the production on newly irrigated lands of any basic agricultural commodity, as defined in the Agricultural Act of 1949, or any amendment thereof, if the total supply of such commodity as estimated by the Secretary of Agriculture for the marketing year in which the bulk

43 USC 371 and
note.
Preliminary
measures.

Conditions.

63 Stat. 1051.
7 USC 1421 note.

PL 99-546, October 27, 1986, 100 Stat 3050

UNITED STATES PUBLIC LAWS
99th Congress - Second Session
Convening January 21, 1986

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DATA SUPPLIED BY THE U.S. DEPARTMENT OF JUSTICE. (SEE SCOPE)
Additions and Deletions are not identified in this document.

PL 99-546 (HR 3113)
October 27, 1986

An Act to implement the Coordinated Operations Agreement, the Suisun Marsh Preservation Agreement, and to amend the Small Reclamation Projects Act of 1956, as amended, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

**TITLE I -- COORDINATED OPERATIONS
PROJECT OPERATION POLICY**

SEC. 101. Section 2 of the Act of August 26, 1937 (50 Stat. 850) is amended by --

(a) inserting at the beginning "(a)"; and

(b) inserting the following new subsection:

"(b)(1) Unless the Secretary of the Interior determines that operation of the Central Valley project in conformity with State water quality standards for the San Francisco Bay/Sacramento-San Joaquin Delta and Estuary is not consistent with the congressional directives applicable to the project, the Secretary is authorized and directed to operate the project, in conjunction with the State of California water project, in conformity with such standards. Should the Secretary of the Interior so determine, then the Secretary shall promptly request the Attorney General to bring an action in the court of proper jurisdiction for the purposes of determining the applicability of such standards to the project. "(2) The Secretary is further directed to operate the Central Valley project, in conjunction with the State water project, so that water supplied at the intake of the Contra Costa Canal is of a quality equal to the water quality standards contained in the Water Right Decision 1485 of the State of California Water Resources Control Board, dated August 16, 1978, except under drought emergency water conditions pursuant to a declaration by the Governor of California. Nothing in the previous sentence shall authorize or require the relocation of the Contra Costa Canal intake."

REIMBURSABLE COSTS

SEC. 102. Section 2 of the Act of August 26, 1937 (50 Stat. 850) is amended by inserting the following new subsection:

"(c)(1) The costs associated with providing Central Valley project water supplies for the purpose of salinity control and for complying with State water quality standards identified in exhibit A of the 'Agreement Between the United States of America and the Department of Water Resources of the State of California for Coordinated Operation of the Central Valley Project and the State Water Project' dated May 20, 1985, shall be allocated among the project purposes and shall be reimbursed in accordance with existing Reclamation law and policy. The costs of providing water for salinity control and for complying with State water quality standards above those standards identified in the previous sentence shall be nonreimbursable.

"(2) The Secretary of the Interior is authorized and directed to undertake a cost allocation study of the Central Valley project, including the provisions of this Act, and to implement such allocations no later than January 1, 1988."

COORDINATED OPERATIONS AGREEMENT

Exhibit "H"

SEC. 103. Section 2 of the Act of August 26, 1937 (50 Stat. 850) is amended by inserting the following new subsection:

"(d) The Secretary of the Interior is authorized and directed to execute and implement the 'Agreement Between the United States of America and the Department of Water Resources of the State of California for Coordinated Operation of the Central Valley Project and the State Water Project' dated May 20, 1985: Provided, That --

"(1) the contract with the State of California referred to in subarticle 10(h)(1) of the agreement referred to in this subsection for the conveyance and purchase of Central Valley project water shall become final only after an Act of Congress approving the execution of the contract by the Secretary of the Interior; and

"(2) the termination provisions of the agreement referred to in this subsection may only be exercised if the Secretary of the Interior or the State of California submits a report to Congress and sixty calendar days have elapsed (which sixty days, however, shall not include days on which either the House of Representatives or the Senate is not in session because of an adjournment of more than three days to a day certain) from the date on which said report has been submitted to the Speaker of the House of Representatives and the President of the Senate for reference to the Committee on Interior and Insular Affairs of the House of Representatives and the Committee on Energy and Natural Resources of the Senate. The report must outline the reasons for terminating the agreement and, in the case of the report by the Secretary of the Interior, include the views of the Administrator of the Environmental Protection Agency and the Governor of the State of California on the Secretary's decision."

REFUGE WATER SUPPLY INVESTIGATION

SEC. 104. The Secretary of the Interior shall not contract for the delivery of more than 75 percent of the firm annual yield of the Central Valley project not currently committed under long-term contracts until one year after the Secretary has transmitted to the Congress a feasibility report, together with his recommendations, on the "Refuge Water Supply Investigations, Central Valley Basin, California."

ADJUSTMENT OF RATES AND ABILITY TO PAY

SEC. 105. The Secretary of the Interior shall include in all new or amended contracts for the delivery of water from the Central Valley project a provision providing for the automatic adjustment of rates by the Secretary of the Interior if it is found that the rate in effect may not be adequate to recover the appropriate share of the existing Federal investment in the project by the year 2030. The contracts shall also include a provision authorizing the Secretary of the Interior to adjust determinations of ability to pay every five years.

OPERATION AND MAINTENANCE DEFICITS

SEC. 106. The Secretary of the Interior shall include in each new or amended contract for the delivery of water from the Central Valley project provisions ensuring that any annual deficit (outstanding or hereafter arising) incurred by a Central Valley project water contractor in the payment of operation and maintenance costs of the Central Valley project is repaid by such contractor under the terms of such new or amended contract, together with interest on any such deficit which arises on or after October 1, 1985, at a rate equal to the average market yields on outstanding marketable obligations of the United States with remaining periods to maturity comparable to the applicable reimbursement period of the project, adjusted to the nearest one-eighth of 1 percent.

TITLE II -- SUISUN MARSH PRESERVATION AGREEMENT AUTHORITY TO ENTER AGREEMENT

SEC. 201. The Secretary of the Interior is authorized to execute and implement the agreement between the Department of the Interior, the State of California and the Suisun Resources Conservation District (dated November 1, 1985).

COST-SHARING PROVISIONS

(iii) evaluation of lower Mokelumne River floodway improvements.

(C) INTERTIES.—Activities under this subparagraph consist of—

(i) evaluation and construction of an intertie between the State Water Project California Aqueduct and the Central Valley Project Delta Mendota Canal, near the City of Tracy, as an operation and maintenance activity, except that the Secretary shall design and construct the intertie in a manner consistent with a possible future expansion of the intertie capacity (as described in subsection (f)(1)(B)); and

(ii) assessment of a connection of the Central Valley Project to the Clifton Court Forebay of the State Water Project, with a corresponding increase in the screened intake of the Forebay.

(D) PROGRAM TO MEET STANDARDS.—

(i) IN GENERAL.—Prior to increasing export limits from the Delta for the purposes of conveying water to south-of-Delta Central Valley Project contractors or increasing deliveries through an intertie, the Secretary shall, not later than 1 year after the date of enactment of this Act, in consultation with the Governor, develop and initiate implementation of a program to meet all existing water quality standards and objectives for which the Central Valley Project has responsibility.

(ii) MEASURES.—In developing and implementing the program, the Secretary shall include, to the maximum extent feasible, the measures described in clauses (iii) through (vii).

(iii) RECIRCULATION PROGRAM.—The Secretary shall incorporate into the program a recirculation program to provide flow, reduce salinity concentrations in the San Joaquin River, and reduce the reliance on the New Melones Reservoir for meeting water quality and fishery flow objectives through the use of excess capacity in export pumping and conveyance facilities.

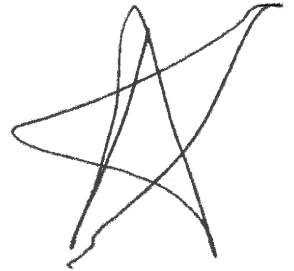
(iv) BEST MANAGEMENT PRACTICES PLAN.—

(I) IN GENERAL.—The Secretary shall develop and implement, in coordination with the State's programs to improve water quality in the San Joaquin River, a best management practices plan to reduce the water quality impacts of the discharges from wildlife refuges that receive water from the Federal Government and discharge salt or other constituents into the San Joaquin River.

(II) COORDINATION WITH INTERESTED PARTIES.—The plan shall be developed in coordination with interested parties in the San Joaquin Valley and the Delta.

(III) COORDINATION WITH ENTITIES THAT DISCHARGE WATER.—The Secretary shall also coordinate activities under this clause with other entities that discharge water into the San Joaquin River to reduce salinity concentrations discharged into

Deadline.



the River, including the timing of discharges to optimize their assimilation.

(v) ACQUISITION OF WATER.—The Secretary shall incorporate into the program the acquisition from willing sellers of water from streams tributary to the San Joaquin River or other sources to provide flow, dilute discharges of salt or other constituents, and to improve water quality in the San Joaquin River below the confluence of the Merced and San Joaquin Rivers, and to reduce the reliance on New Melones Reservoir for meeting water quality and fishery flow objectives.

(vi) PURPOSE.—The purpose of the authority and direction provided to the Secretary under this subparagraph is to provide greater flexibility in meeting the existing water quality standards and objectives for which the Central Valley Project has responsibility so as to reduce the demand on water from New Melones Reservoir used for that purpose and to assist the Secretary in meeting any obligations to Central Valley Project contractors from the New Melones Project.

(vii) UPDATING OF NEW MELONES OPERATING PLAN.—The Secretary shall update the New Melones operating plan to take into account, among other things, the actions described in this title that are designed to reduce the reliance on New Melones Reservoir for meeting water quality and fishery flow objectives, and to ensure that actions to enhance fisheries in the Stanislaus River are based on the best available science.

(3) WATER USE EFFICIENCY.—

(A) WATER CONSERVATION PROJECTS.—Activities under this paragraph include water conservation projects that provide water supply reliability, water quality, and ecosystem benefits to the California Bay-Delta system.

(B) TECHNICAL ASSISTANCE.—Activities under this paragraph include technical assistance for urban and agricultural water conservation projects.

(C) WATER RECYCLING AND DESALINATION PROJECTS.—Activities under this paragraph include water recycling and desalination projects, including groundwater remediation projects and projects identified in the Bay Area Water Plan and the Southern California Comprehensive Water Reclamation and Reuse Study and other projects, giving priority to projects that include regional solutions to benefit regional water supply and reliability needs.

(D) WATER MEASUREMENT AND TRANSFER ACTIONS.—Activities under this paragraph include water measurement and transfer actions.

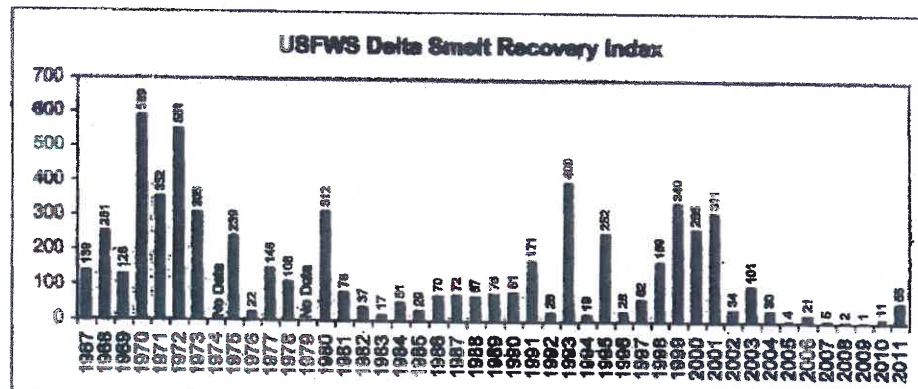
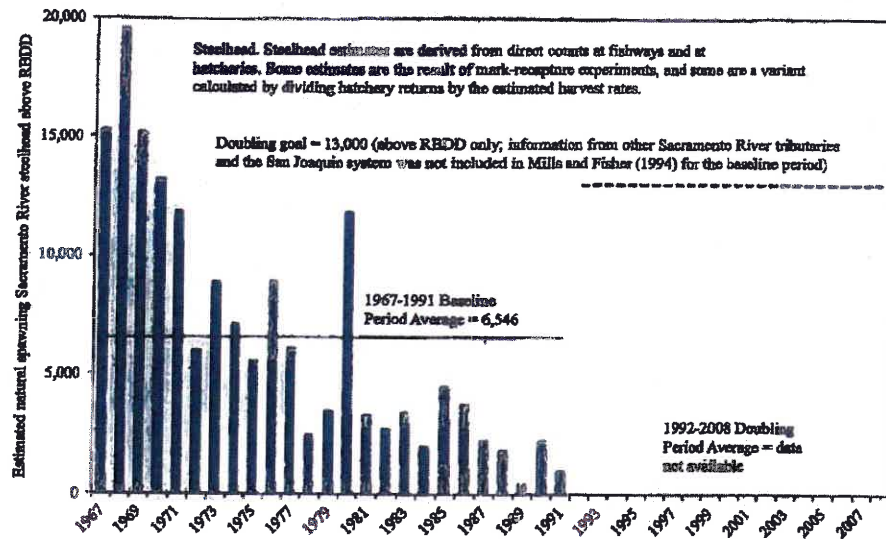
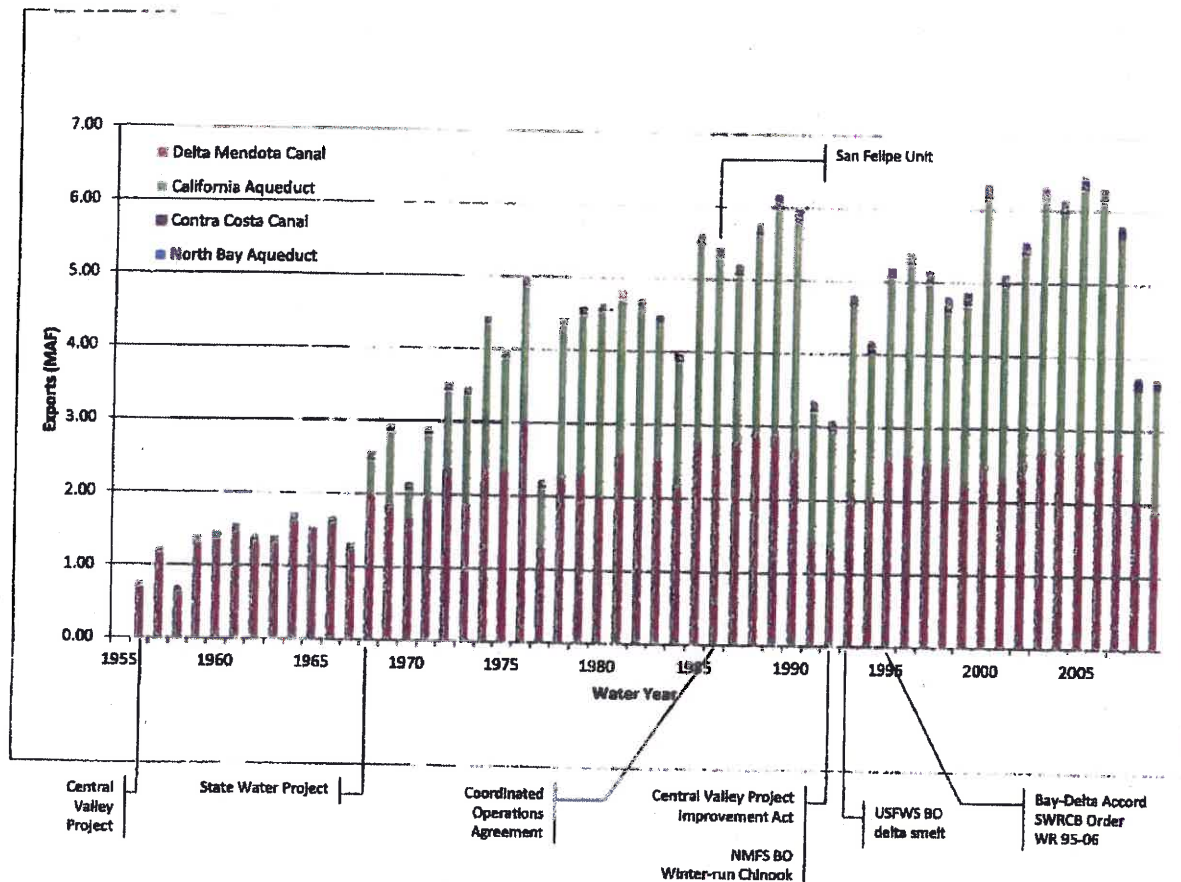
(E) URBAN WATER CONSERVATION.—Activities under this paragraph include implementation of best management practices for urban water conservation.

(F) RECLAMATION AND RECYCLING PROJECTS.—

(i) PROJECTS.—This subparagraph applies to—

(I) projects identified in the Southern California Comprehensive Water Reclamation and Reuse Study, dated April 2001 and authorized by

Applicability.



2-1-13

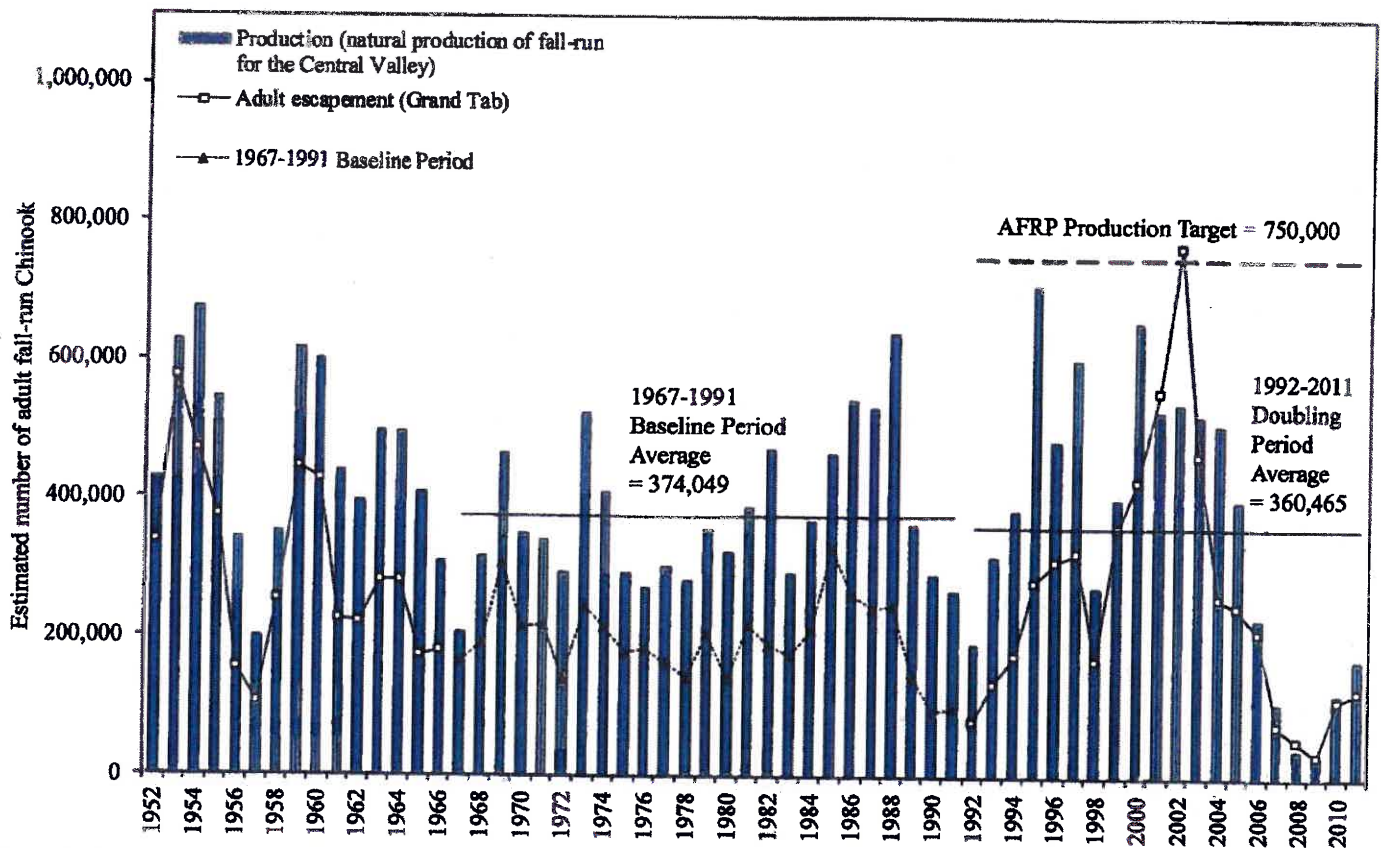


Figure 2. Estimated yearly natural production and in-river escapement of adult fall-run Chinook salmon in the Central Valley rivers and streams. 1952 - 1966 and 1992 - 2011 numbers are from CDFG Grand Tab (Apr 24, 2012). 1967-1991 Baseline Period numbers are from Mills and Fisher (CDFG, 1994).

2-1-13

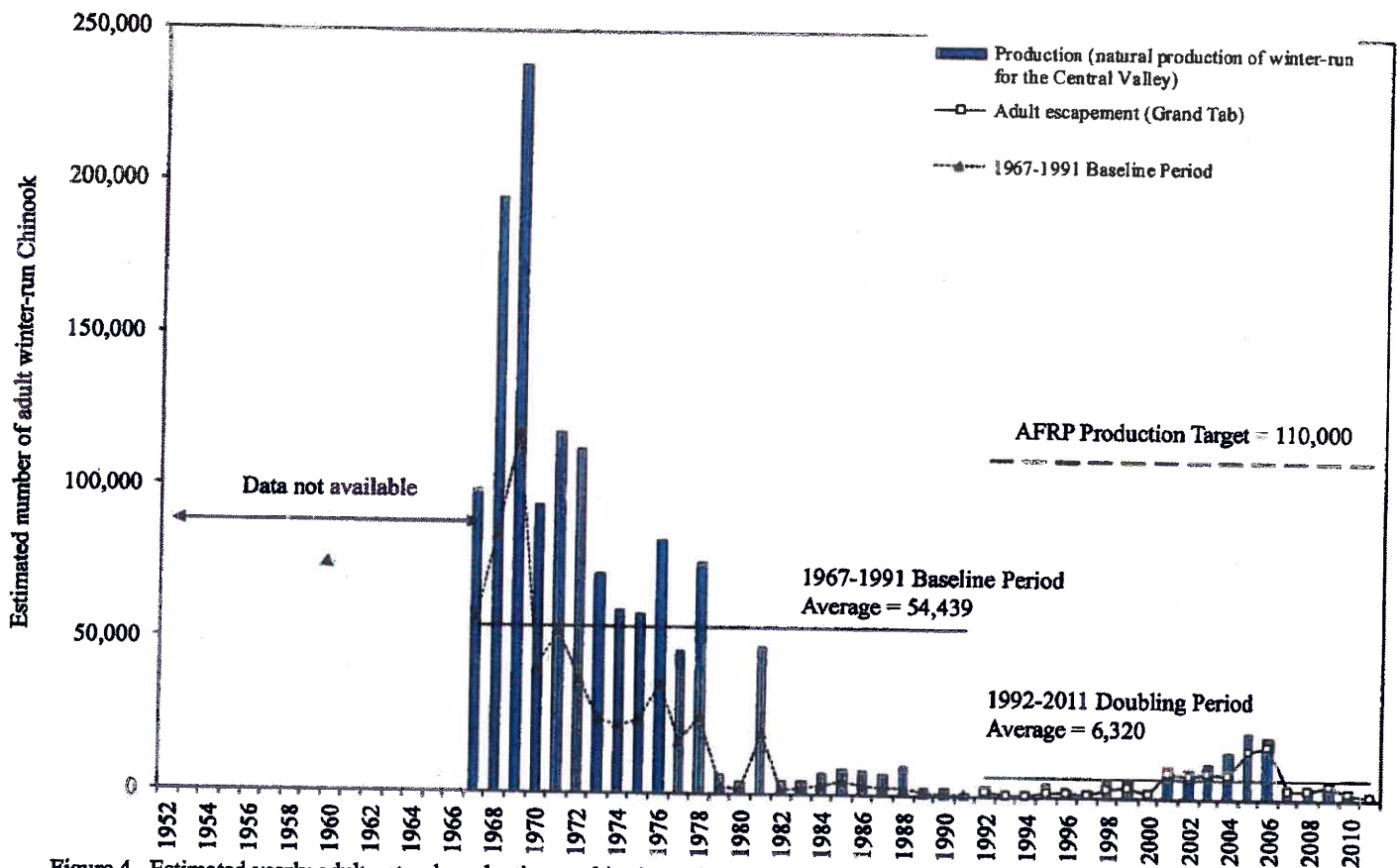


Figure 4. Estimated yearly adult natural production, and in river adult escapements of winter-run Chinook salmon in the Central Valley rivers and streams. 1992 - 2011 numbers are from CDFG Grand Tab (Apr 24, 2012). 1967-1991 Baseline Period numbers are from Mills and Fisher (CDFG, 1994).

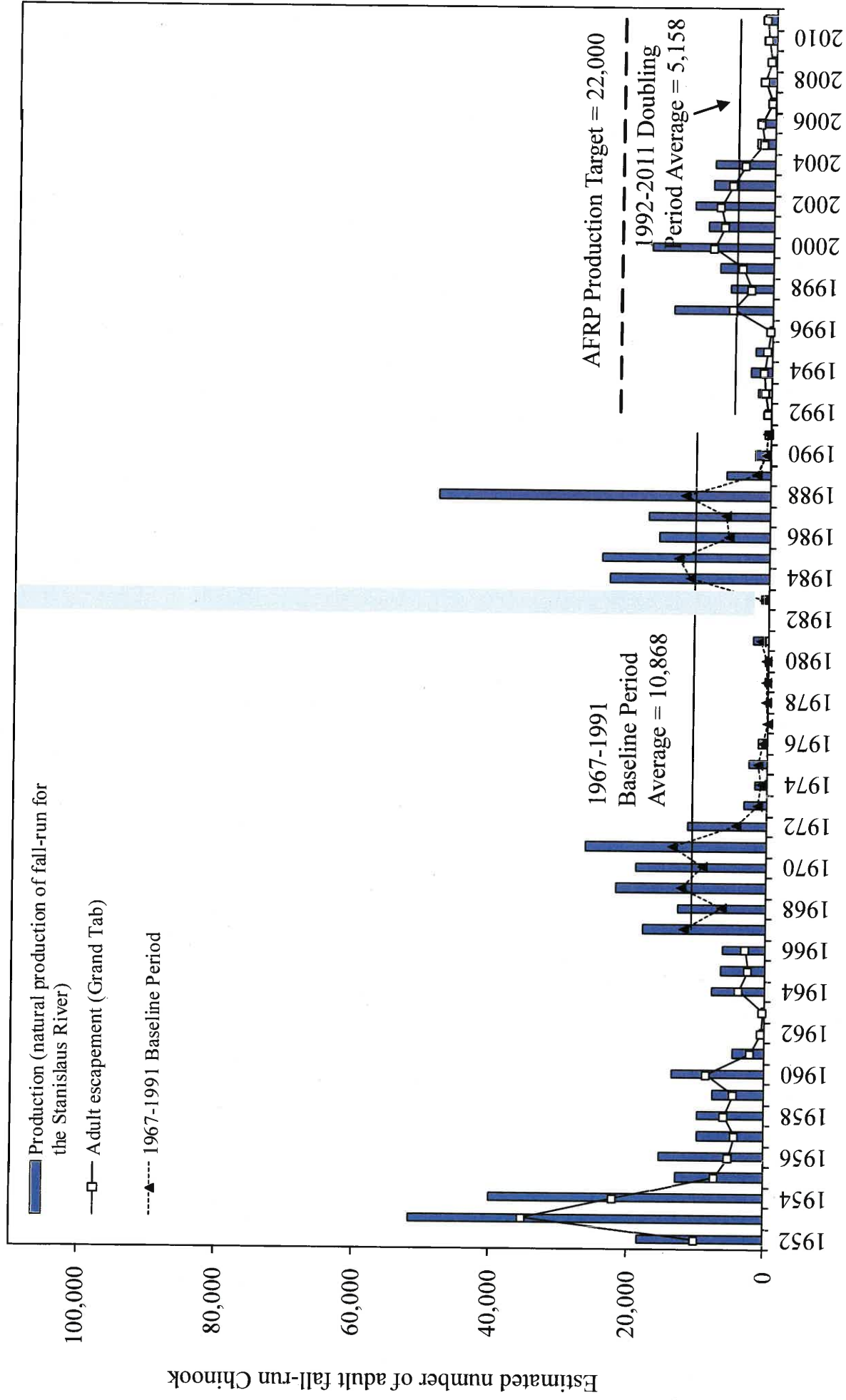


Figure 32. Estimated yearly natural production, and in river escapements of Stanislaus River adult fall-run Chinook salmon. 1952 – 1966, and 1992 – 2011 numbers are from CDFG Grand Tab (Apr 24, 2012). 1967-1991 Baseline Period numbers are from Mills and Fisher (CDFG, 1994). □ = data was not available for 1982.

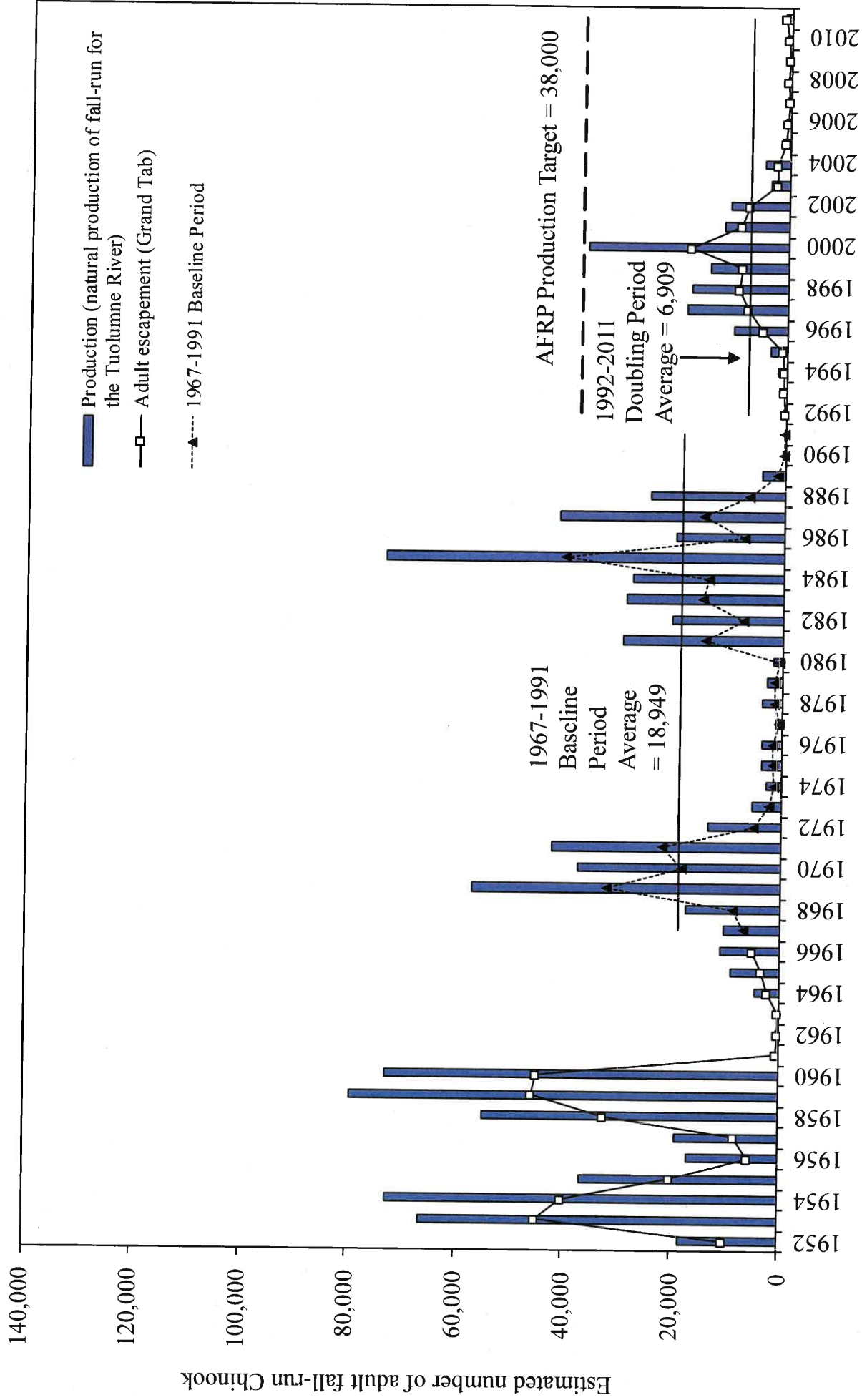


Figure 33. Estimated yearly natural production, and in river escapements of Tuolumne River adult fall-run Chinook salmon. 1952 - 1966, and 1992 - 2011 numbers are from CDFG Grand Tab (Apr 24, 2012). 1967-1991 Baseline Period numbers are from Mills and Fisher (CDFG, 1994).

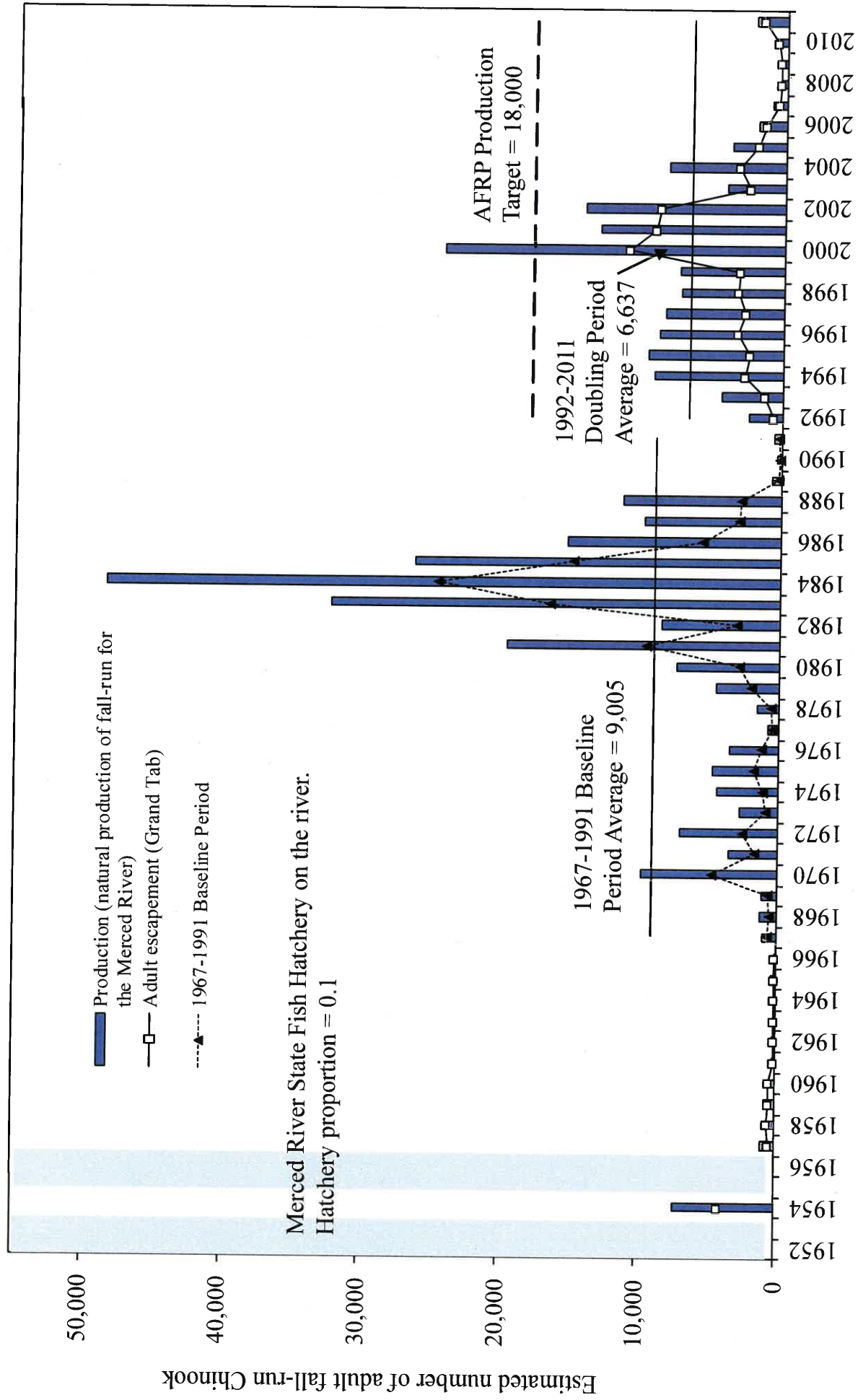


Figure 34. Estimated yearly natural production, and in river escapements of Merced River adult fall-run Chinook salmon. 1952 - 1966, and 1992 - 2011 numbers are from CDFG Grand Tab (Apr 24, 2012). \square data was not available for 1952 - 1953, and 1955 - 1956. 1967-1991 Baseline Period numbers are from Mills and Fisher (CDFG, 1994).

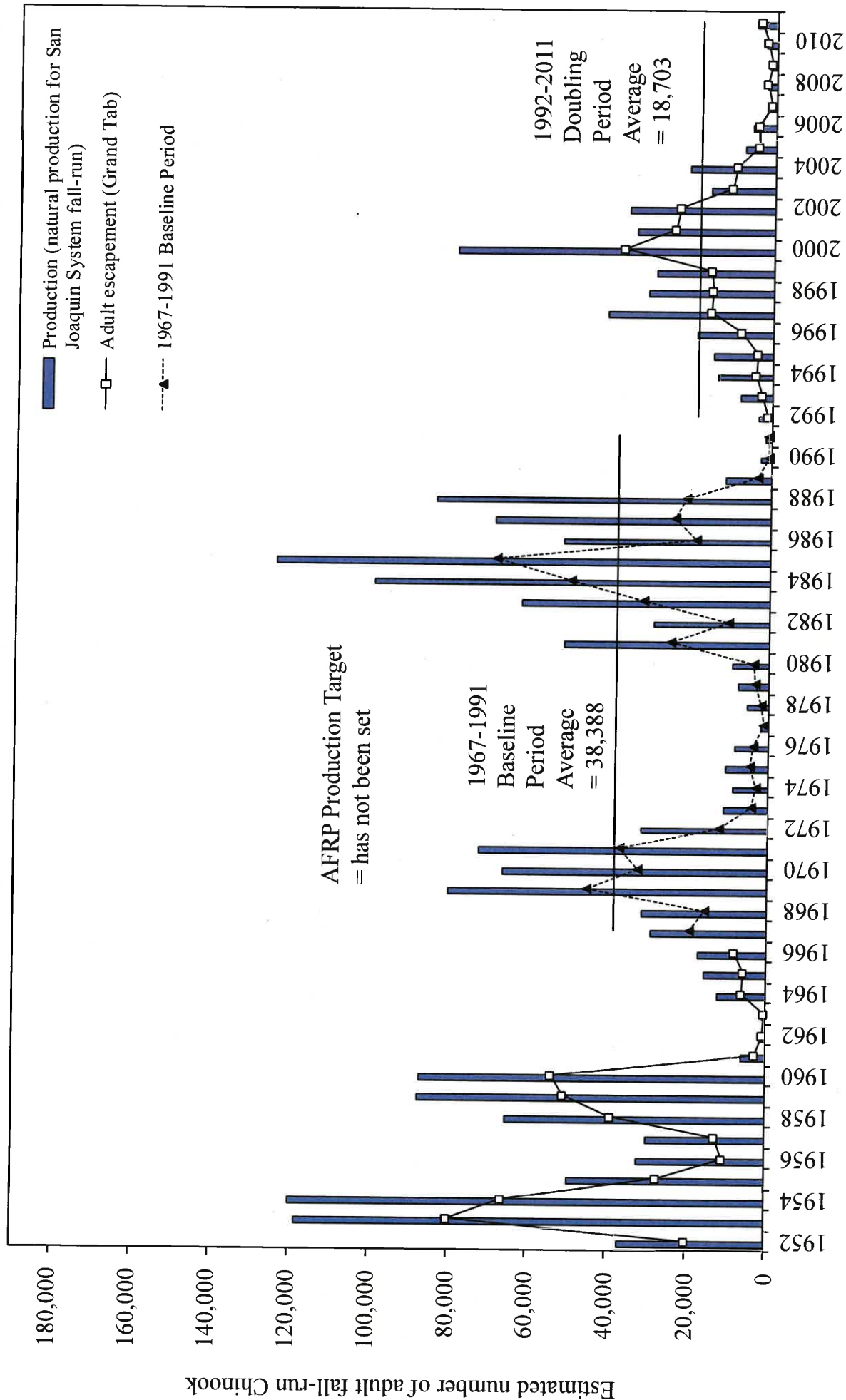
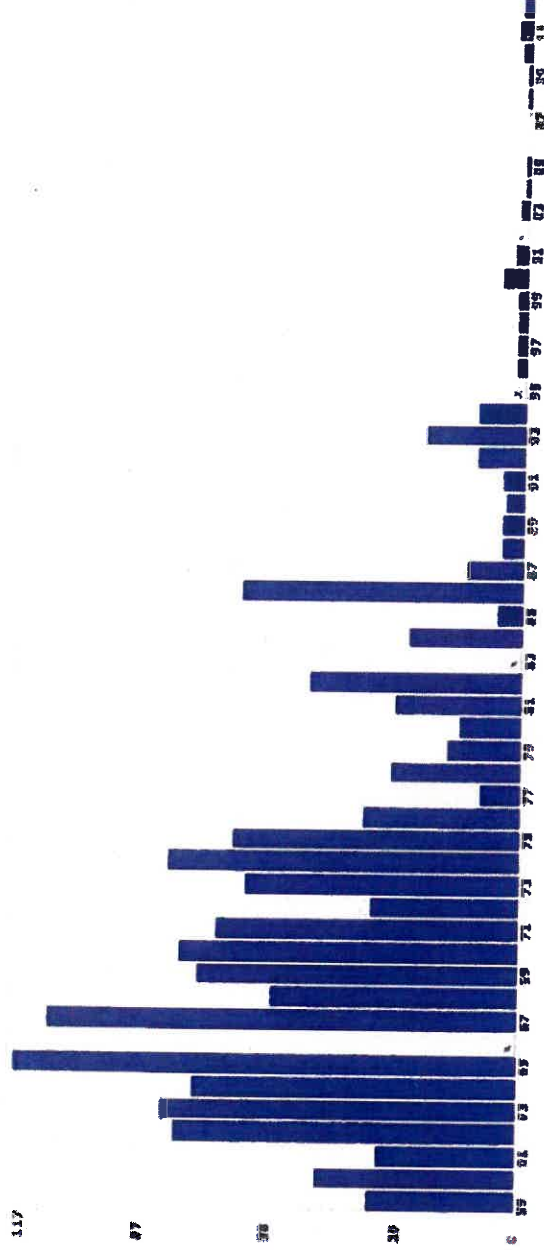


Figure 35. Estimated yearly natural production, and in river escapements of San Joaquin System adult fall-run Chinook salmon. The San Joaquin System is the sum of the Stanislaus, Tuolumne, and Merced Rivers. 1952 - 1966, and 1992 - 2011 numbers are from CDFG Grand Tab (Apr 24, 2012). 1967-1991 Baseline Period numbers are from Mills and Fisher (CDFG, 1994).



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Striped Bass Indices



Striped Bass Indices

YEAR	INDEXDATE	DELTA INDEX	SUISUN BAY INDEX	TOTAL INDEX
1959	12-Jul	30.7	3.0	33.7
1960	16-Jul	32.0	13.6	45.6
1961	21-Jul	25.2	6.4	31.6
1962	26-Jul	46.8	32.1	78.9
1963	3-Aug	38.2	43.5	81.7
1964	1-Aug	54.7	20.7	75.4

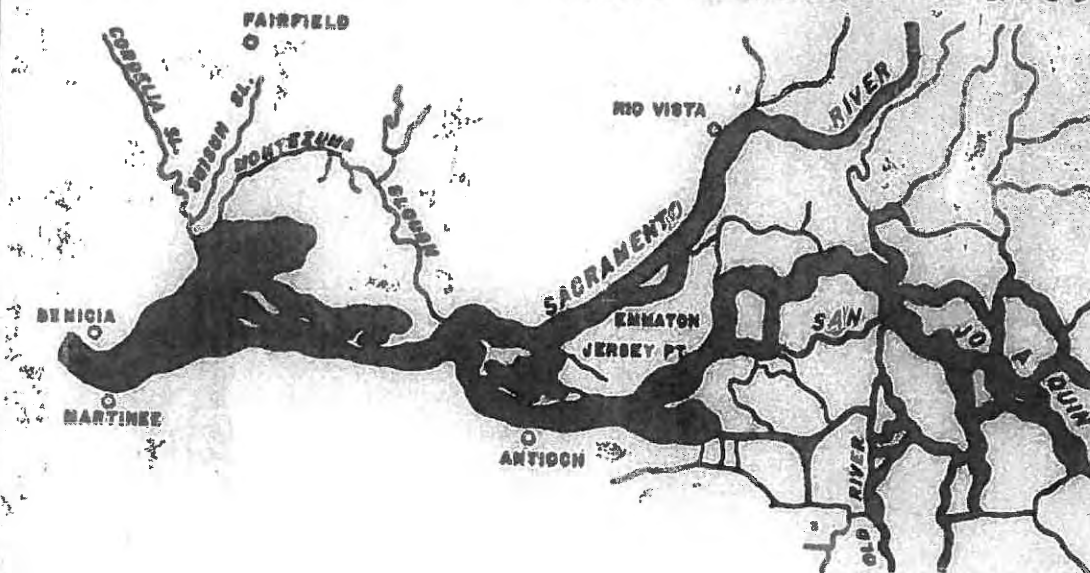
Exhibit "M"

water right Decision 1485

In the Matter of Permit 12720 (Application 5625) and Other
Permits of United States Bureau of Reclamation for the
Federal Central Valley Project and of California Department
of Water Resources for the State Water Project.

DECISION IN FURTHERANCE OF JURISDICTION RESERVED
IN DECISIONS D 698, D 990, D 1020, D 1260, D 1275, D 1291,
D 1308, D 1358, and PERMIT ORDER 124

Sacramento-San Joaquin Delta and Suisun Marsh



August 1978
STATE WATER RESOURCES CONTROL BOARD

executed. The criteria in the draft agreement were recommended by Fish and Game and endorsed by the Department, and were extensively analyzed by the Board staff. Based on our most current assessment, the fishery standards provide significantly higher protection than existing basin plans. The Striped Bass Index is a measure of young bass survival through their first summer. The Striped Bass Index would be 71 under without project conditions (i.e., theoretical conditions which would exist today in the Delta and Marsh in the absence of the CVP and SWP), 63 under the existing basin plans, and about 79^{3/4} under this decision.

While the standards in this decision approach without project levels of protection for striped bass, there are many other species, such as white catfish, shad and salmon, which would not be protected to this level. To provide full mitigation of project impacts on all fishery species now would require the virtual shutting down of the project export pumps. The level of protection provided under this decision is nonetheless a reasonable level of protection until final determinations are made concerning a cross-Delta transfer facility or other means to mitigate project impacts.

3/ There is some indication that factors other than those considered in the Board's analysis of without project levels may also affect striped bass survival. The effects of these factors are such that the without project levels would be greater than 71. However, the magnitude of this impact is unknown and cannot be quantified at this time.

D 1485
1978

NO SHUT DOWN
INSTEAD
INCREASED EXPORT

Suisun Marsh. Full protection of Suisun Marsh now could be accomplished only by requiring up to 2 million acre-feet of freshwater outflow in dry and critical years in addition to that required to meet other standards. This requirement would result in a one-third reduction in combined firm exportable yield of

State and federal projects. In theory, the existing Basin 5B Plan purports to provide full protection to the Marsh. However, during the 1976-77 drought when the basin plan was in effect, the Marsh received little if any protection because the system almost ran out of water and emergency regulations had to be imposed. This decision balances the limitations of available water supplies against the mitigation responsibility of the projects. This balance is based on the constitutional mandate "...that the water resources of the State be put to beneficial use to the fullest extent of which they are capable..." and that unreasonable use and unreasonable diversion be prevented (Article 10, Section 2, California Constitution).

The Bureau, the Department, Fish and Game, and U. S. Fish and Wildlife Service are working together to develop alternative water supplies for the Marsh. Such alternative supplies appear to represent a feasible and reasonable method for protection of the Marsh and mitigation of the adverse impacts of the projects. Under this decision the Department and Bureau are required, in cooperation with other agencies, to develop a plan for Suisun Marsh by July 1, 1979. The Suisun Marsh plan should ensure that the

Jeff Opperman
Final Report for Fellowship R/SF-4

My CALFED fellowship (R/SF-4) had three primary research areas: (1) how native fish use California floodplains; (2) developing a method to identify and quantify a particular type of floodplain in the Sacramento Valley; and (3) a white paper for CALFED that reviews, summarizes, and synthesizes research on floodplains generally, and Central Valley floodplains specifically.

1. Native fish and floodplains.

For this research I collaborated with Carson Jeffres, a graduate student at UC Davis (this research was his Master's thesis). We compared the growth rates of juvenile Chinook salmon between various floodplain and riverine habitats. This study built on previous work; (1) in the Yolo Bypass that found that juvenile Chinook grew faster in the flooded Bypass than in the nearby Sacramento River and; (2) in the Cosumnes Preserve which showed that native, wild juvenile Chinook salmon appeared to use the Cosumnes floodplain for rearing when it was inundated.

Juvenile salmon were obtained from a hatchery on the Mokelumne River and placed in enclosures within the Cosumnes River and floodplain (ten fish per enclosure). For two flood seasons (2004 and 2005), six enclosures were placed in each of three different habitat types in the floodplain and two locations in the river (30 enclosures total). Floodplain habitats included an ephemeral pond, flooded terrestrial herbaceous vegetation, and a pond that was permanent during the first year of the study and ephemeral during the second. The river locations were the river channel above the floodplain and the river channel below the floodplain.

The fish were measured at one week intervals, although measurement frequency declined during large flood events that made access difficult. In 2004 fish were measured three times over 4.5 weeks and in 2005 they were measured four times over 8 weeks. After the final measurement the fish were sacrificed and a sub-set were saved for a gut-content analysis.

In general, fish had faster growth rates in floodplain habitats than in the river. During periods of low, clear water, fish growth rates in the river site above the floodplain were comparable to those in the floodplain. However, during higher flows, with more turbid water, growth in the river above the floodplain was significantly lower than on the floodplain. Fish in the river below the floodplain, which was representative of intertidal delta habitat, were consistently low.

The main channel of the Cosumnes River, like those of many Central Valley rivers, is incised and lacks complexity. There are few side channels, backwaters, or accessible floodplain habitats (other than the Cosumnes Preserve). Thus, juvenile fish will tend to be displaced downstream during high flow events. In the Cosumnes, juvenile fish will be flushed downstream to either the intertidal delta or the floodplain. Among these two

habitats, the floodplain appears to provide significantly better habitat for rearing (Figure 1).

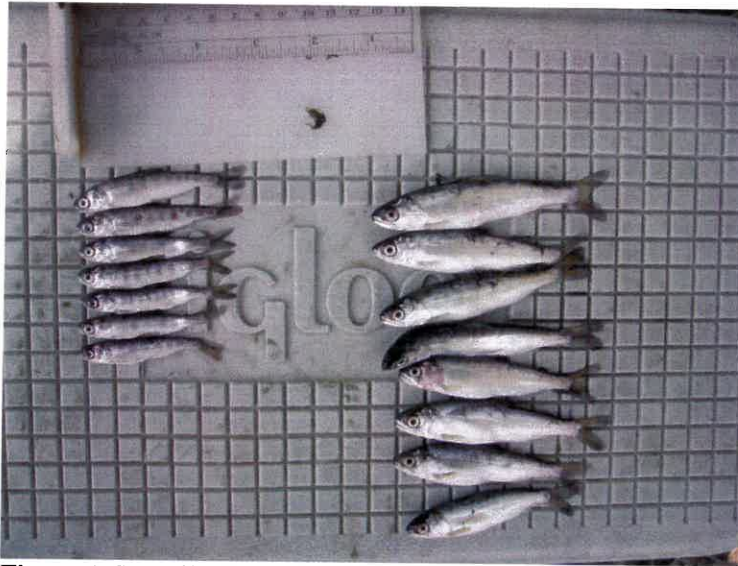


Figure 1. Juvenile Chinook on the right were reared within an enclosure within the Cosumnes River floodplain while those on the left were reared within an enclosure in the river below the floodplain (intertidal Delta habitat).

This study confirms that juvenile Chinook benefit from access to floodplain habitats. While river habitats comparable to those above the floodplain can support similar growth rates as the floodplain, this habitat is more variable. During high flows the river offers poor habitat and fish living in this type of habitat will tend to be displaced downstream. The floodplain can provide optimal growing conditions during such floods and likely offers superior habitat conditions to the downstream Delta.

The risk of fish stranding on the floodplain merits further research. However, initial research on the Cosumnes suggests that native fish tend to respond to cues that facilitate emigration from the floodplain during draining and that primarily non-native fish become stranded. This work further supports the concept that floodplain restoration can be an important strategy for restoring Central Valley salmon populations.

This research is summarized in:

Jeffres, C., J. Opperman, and P. B. Moyle. *Submitted*. Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. Submitted to Environmental Biology of Fishes.

This work has also been presented at the following conferences:

1. Floodplain Management Association 2005
2. Society for Ecological Restoration 2005
3. Riverine Hydroecology (Stirling, Scotland) 2006

2. Identifying and mapping the floodplain inundated by the Floodplain Activation Flood.

Working in collaboration with Phil Williams and Associates (PWA), we worked to define, identify, and quantify a particular type of floodplain: that which is inundated by a Floodplain Activation Flood (FAF). The FAF is a relatively frequent, long duration, spring-time flood that has particular value for native fish and food web productivity (see text on floodplain conceptual model below for further description of a Floodplain Activation Flood).

The FAF was defined as follows:

1. occurs in two out of three years (67% exceedance probability)
2. duration of at least one week
3. occurs between March 15 and May 15.

These criteria were applied to a series of paired gauges along the Sacramento River and within the Yolo Bypass. This process derived a flood stage elevation that corresponded to the FAF criteria. This flood stage was then used to develop a water surface that was applied to topography for the Sacramento River and surrounding floodplain (from US Army Corps of Engineers' Sacramento-San Joaquin Comprehensive Study), estimating the area of floodplain inundated during the FAF.

We found that there is very little floodplain area inundated by the FAF in the current Sacramento Valley. Nearly all floodplain that corresponds to the FAF is found within the Yolo Bypass.

This work is further described in:

Philip Williams & Associates, L., and J. J. Opperman. 2006. The frequently activated floodplain: quantifying a remnant landscape in the Sacramento Valley, San Francisco, CA.

Williams, P., J. Opperman, E. Andrews, S. Bozkurt, and P. Moyle. Quantifying activated floodplain on a lowland regulated river. *In preparation for San Francisco Estuary and Watershed Science.*

3. The Central Valley Floodplain White Paper

I am continuing to work on the floodplain white paper along with my co-author, Peter Moyle. A central part of the white paper is a conceptual model for Central Valley floodplains, briefly described below.

This work has been presented at the following conferences:

1. Floodplain Management Association, 2005
2. American Geophysical Union and the North American Benthological Society, 2005
3. Society for Ecological Restoration, 2005

4. State of the Estuary Conference, 2005
5. CALFED Science Conference, 2006
6. Riverine Hydroecology (Stirling, Scotland), 2006
7. State of Washington, the Ecological Value of High Flows, 2006

Brief overview of conceptual model:

Floodplains support high levels of biodiversity and are among the most productive ecosystems in the world. They provide a range of ecosystem services to human society, including storage and conveyance of flood flows, groundwater recharge, open space, recreational opportunities, and habitat for a diversity of species, many of them of economic importance. Among the world's ecosystem types, Costanza et al. (1997) ranked floodplains second only to estuaries in terms of the ecosystem services provided to society. In the Central Valley, the most important ecosystem services provided by floodplains include reduction of flood risk and habitat for numerous species, including commercially and recreationally valuable species (e.g., chinook salmon and waterfowl) and for endangered species. Recent research has demonstrated that floodplains provide necessary spawning habitat for the Sacramento splittail, an endemic minnow (Sommer et al. 1997) and that juvenile chinook salmon grow faster on floodplains than in main-stem river channels (Sommer et al. 2001b) (Figure 1). Productivity from floodplains can be exported to the Sacramento-San Joaquin Delta, where food limitation is likely one of the factors contributing to the decline of fish species (Jassby and Cloern 2000, Schemel et al. 2004). Further, in places such as the Yolo Bypass, ecologically valuable floodplains can be compatible with productive agriculture (Sommer et al. 2001a).

Recognizing these valuable services, state and federal agencies have expressed policy goals to restore floodplains in the Central Valley (CALFED Bay-Delta Program 2000). Further, flood management projects in the Central Valley now generally include a floodplain restoration component. To guide these restoration efforts, we convened a floodplain working group, composed of floodplain experts drawn from academia, agencies, NGOs, and the private sector, to define ecologically functional floodplains. This group described three primary components of ecologically functional floodplains:

- **Connectivity** between river and floodplain.
- **Hydrological variability**
- **Sufficient geographic scale** for associated ecological benefits to be meaningful on a system- or population-scale.

We developed a conceptual model of floodplain processes based on the scientific literature, our collective experiences studying floodplains, and guidance from the floodplain working group (Figure 2). This conceptual model illustrates the linkages between physical and biological processes in floodplains and can be used to inform floodplain restoration projects.

Organization of the conceptual model.

A diverse range of flows influence floodplain geomorphic and ecological processes, ranging from flows below bankfull to large, rare, and highly erosive floods. Numerous aspects of these flows have geomorphic and ecological significance, including magnitude, frequency, duration, rates of change, and seasonality, as well as antecedent conditions on the floodplain. To simplify, our conceptual model focuses on three types of 'representative floods,' characterized by their frequency and magnitude, which are found in the blue boxes in the Hydrology portion of the model. These floods perform geomorphic work, described in the brown-outline boxes in the Geomorphology portion of the model. Hydrologic and geomorphic processes create the conditions for Ecosystem Responses and Processes to occur (green-outlined boxes). The Ecosystem Responses and Processes produce Ecological Benefits, the magnitudes of which are influenced by the geographic scale of floodplain. Two representative floods, the Floodplain Activation Flood and the Floodplain Reorganization Flood are illustrated in Figures 2 and 3 and described below.

Two representative floods

Floodplain Activation Flood. The floodplain activation flood (FAF) is a small-magnitude flood that occurs relatively frequently (e.g., almost every year) (Figure 3). The FAF can be further defined in terms of seasonality and duration—for example a flood that lasts at least one week and occurs in the Spring. The following article by Betty Andrews defines a FAF in terms of frequency, season, and duration and then describes a process to map the floodplain that corresponds to the FAF in the Sacramento Valley. A long duration flood produces characteristic ecological benefits such as habitat for native fish spawning and rearing (Figure 1) and food web productivity. The duration of the flood is important as these processes cannot occur during a short event. The seasonality of the flood also influences which ecological processes occur (see the temporal scale bar (Winter □ Late spring) in one of the ecological process boxes). The importance of duration and seasonality for a FAF is indicated by the question mark adjacent to the flood occurring in late January on the hydrograph in Figure 2 (a short, winter-time flood). Because floodplains can remain inundated for a period of time after the loss of direct connection with river flows, a series of short connections can also function as a floodplain activation flood.

Floodplain Reorganization Flood. The floodplain reorganization flood is a greater magnitude flood that occurs less frequently (Figure 3). This higher energy flood produces geomorphic work including extensive erosion and deposition on the floodplain which creates heterogeneous floodplain topography. In turn, these dynamic events and heterogeneous topography create a diverse ecosystem with vegetation patches of varying age, species composition and structure, and floodplain water bodies of varying successional stage and connectivity to the river. The ecosystem processes that occur during a Floodplain Activation Flood take place within the mosaic of habitat features created during Floodplain Reorganization Floods.

Conclusions

The model illustrates the importance of hydrological variability for an ecologically functional floodplain. For example, a floodplain that rarely is inundated by a Floodplain

Activation Flood will not produce the ecological benefits of food web productivity or spawning and rearing habitat for native fish. A floodplain that is not subject to Floodplain Reorganization Floods will not maintain the mosaic of habitats (e.g., vegetation and water bodies of varying successional stages) that help support floodplain biodiversity. Therefore, floodplain restoration projects should not only focus on reintroducing connectivity between rivers and floodplains. Floodplain managers should also ask the following questions about this connectivity: how often, for how long, in what season, and of what magnitude? The answers to these questions will strongly influence the range of ecological benefits that the restored floodplain can provide.

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- Schemel, L. E., T. R. Sommer, A. B. Muller-Solger, and W. C. Harrell. 2004. Hydrological variability, water chemistry, and phytoplankton biomass in a large floodplain of the Sacramento River, CA, USA. *Hydrobiologia* 513: 129-139.
- Sommer, T., R. Baxter, and B. Herbold. 1997. Resilience of splittail in the Sacramento-San Joaquin estuary. *Trans. Am. Fish. Soc.* 126: 961-976.
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- Sommer, T. R., M. L. Nobriga, W. C. Harrell, W. Batham, and W. J. Kimmerer. 2001b. Floodplain rearing of juvenile chinook salmon: evidence of enhanced growth and survival. *Canadian Journal of Fisheries and Aquatic Sciences* 58: 325-333.

Figure 2. Floodplain Conceptual Model

